



SATURDAY, MAY 23, 1874.

THE MASTER MECHANICS' ASSOCIATION.

Report of the Seventh Annual Convention.

The seventh annual session of this Association was held in Kingsbury Hall, Chicago, beginning on Tuesday, May 12, and was called to order by the President, Mr. H. M. Britton.

The following report is compiled from the Chicago dailies, and chiefly from the Times:

TUESDAY'S SESSION.

Prayer was offered by the Rev. Dr. McKeown, of the Methodist Episcopal Church.

The Secretary presented the minutes of the previous meeting, which were approved without reading.

MEMBERS.

On the calling of the roll, the following members answered to their names:

H. M. Britton, Cincinnati; A. W. Britton, Harrison, O.; H. L. Brown, Jersey City; J. M. Boon, Fort Wayne; R. W. Bushnell, Cedar Rapids; Wm. H. Bryant, Chicago; N. E. Chapman, Cleveland; G. W. Cushing, St. Paul; A. H. De Clercq, Peoria; Wm. Fuller, Meadville, Pa.; Charles Fellows, Cleveland; E. B. Gibbs, Louisville; C. Graham, Kingston, Pa.; E. Garfield, Hartford; A. Gould, Rochester; F. Gould, Sedalia, Mo.; S. J. Hayes, Chicago; W. S. Hudson, Paterson, N. J.; C. W. Hollister, Hartford; Jacob Johann, Trenton, Mich.; Robert King, Columbia, S. C.; T. N. Looze, Indianapolis; J. N. Lauder, Concord, N. H.; Lyell T. Mead, Hudson, Wis.; Ezra Osborn, Paterson, N. J.; T. B. Purver, Greensburg, N. Y.; W. A. Robinson, Hamilton, Canada; A. H. Somers, Valparaiso, Ind.; W. T. Smith, Erie, Pa.; W. M. Strong, New York; N. H. Sprague, Pittsburgh; N. Slingland, Hartford; H. A. Towne, St. Paul; John Thompson, East Boston, Mass.

Associate Members—Coleman Sellers, Philadelphia; M. N. Forney, New York; J. O. D. Lilly, Indianapolis; F. B. Miles, Philadelphia.

The Secretary, on request of the President, read the articles of the constitution in reference to membership qualifications. An opportunity was offered to those desiring, and entitled to the privileges, to sign the constitution and become members. The following availed themselves of the opportunity:

John B. Morgan, Danville, Ill.; H. N. Farris, Topeka, Kan.; L. B. Salisbury, Mt. Vernon, Ill.; C. R. Morris, Farm Village, Ct.; R. F. Hurd, Pekin, Ill.; Philip White, Wellsville, O.; B. P. Woodruff, Eldora, Iowa; B. Morron, St. Louis; J. A. Houghlin, Armstrong, Kan.; L. Finlay, Little Rock, Ark.; E. T. Jeffrey, Chicago; H. Schocks, Chicago; G. W. Stratton, Altoona, Pa.; W. A. Field, Portland, Me.; Charles Metzger, Louisville; J. C. Munroe, St. Paul; Wm. Wilson, Galesburg, Ill.

PRESIDENT'S ADDRESS.

The President, H. M. Britton, then read the following address:

Gentlemen of the American Railway Master Mechanics' Association:—For the seventh time it becomes my duty and pleasure to welcome our annual re-union. Each returning year has added to the strength of our numbers, to the vigor of our organization, and the usefulness which has been the aim and object of our society. This Association was born of a new industry. Since its birth, the period during which the child still remains near the mother's knee has hardly elapsed, yet we can point with pride to what it has done. It has united what has become a profession. It has mingled the thoughts, the ideas, the experiments and the ascertained results obtained by the members of the profession; sifted them, culled what was good, thrown away the chaff, collated the facts and given the benefits as far as ascertained to the world. So much yet remains to be done, that the society should boast of having accomplished very little.

At the opening of our sixth convention, a year ago, I took occasion to call your attention to the dangers that threatened the railways in many of the States, in view of the hopes entertained by producers living at great distances from the sea-board, of realizing all the profits of an Eastern market for Western product through the medium of a railway. Men not practical in the art of building railways, or the business of operating them, held out this delusive hope to those from whom they desired to obtain the money to construct a road.

Such men made money in building the road, and little cared they whether it would be profitably operated or not.

I then called attention to the fact that more had been done with the machinery you represent than had been hoped for or deemed possible, and warned you that where seeming impossibilities had been accomplished there was danger that the really impossible would be attempted. The past year has been fruitful in financial disaster to the railways of the West. All that then seemed possible and more has happened, or is in daily progress of occurrence. The farmer, decaying in donating his money for the building of a railway, finding he had received no such benefit as he expected from its construction and operation, has become a granger. The granger has become a legislator, and rates of freight have been made by legislative enactment, without reference to the cost of transportation. Thus the framing of a practical railway tariff, the most difficult task to which the experienced railroad managers have to address themselves, has been solved by these legislators, by the passage of some general enactment which has had but a few hours' consideration. A great variety of causes have combined to embarrass or bankrupt many of the railways of the country.

It becomes the duty of this Convention to examine into these causes, to ascertain, if possible, the measure of its own responsibility, and so far as it has the power, to apply a remedy. The principal cause of the present non-paying condition of many of the railways is that the business has been overdone. This, professionally, we had no part in doing. It is one of the strange truths connected with railway business, that the practical man is rarely consulted, either as to the manner in which a road shall be constructed, or as to whether it will pay to operate it. But disaster always follows the overdoing of any business, and in that disaster we are involved.

Have we not had some share in increasing the disaster? Have we done all we might have done to avert it? In building so many roads through sparsely-settled regions of our country, in building so many unnecessary and competing roads, great wrong has been done to legitimate railway enterprises. No railway can pay the interest on its cost when it is obliged to rely for its traffic on the simple, bulky farm products of the country through which it passes. The railway must connect city with city, or must have a large manufacturing or mining interest on its line, to enable it to earn the interest on its cost. These facts are strikingly illustrated in the recent public statement of some of the largest through lines, made in connection with a statement of the earnings of their feeders. These statements show that while the through line earns largely, the losses on the feeders absorb their earnings.

and more. The through line connects city with city, manufactory and mine with the market for its product. Its passenger and freight business are profitable at reasonable rates. The feeder hauls freight only at a great cost in collecting and handling, while its passenger trains are almost always operated at a loss. The competing through line cuts every legitimate rate both for freight and passengers, and reduces the whole business to a losing one. The overdoing of the business, then, by building feeders, not self-sustaining, and parallel through lines, not required for the transaction of legitimate business, is the great cause of the present distrust in all railway enterprise.

This overdoing of the business by constructing unnecessary roads is not all. The roads have not been well built. During their construction their financial affairs have not been honestly administered. The wide-spread disaster and distrust which now exist would be more easily overcome if this were not true. The roads have mostly been built from the proceeds of bonds sold at a heavy discount, and by contractors who built for their own profit, so the bonded debt represents often more than twice the cost of the road, and the road itself has to be thoroughly rebuilt by those who operate it during the first few years of its existence. All this you know to be true, gentlemen, yet I hear you ask me, What have we, as master mechanics, to do with it? How are we responsible? I am quite aware that your responsibility only begins when the railway is finished and its rolling stock is to be operated. You are skilled in the profession. All that you are and all that you hope to become depend upon the well-being and good management of railways now and their prosperity in the future. Every week, almost every day, some practical man is sought to operate a railway; this is an assurance that you are to have more to say in these matters in the future than you have had in the past, and it is therefore well that your attention should be called to them. It is well that you who, as practical men, are to make the earnings of the railway, should know whether its debts represent its cost or double its cost. It is well that when you go on a new road you should know whether it has to be rebuilt after a dishonest contractor. It is well, above all, when you are invited to a position on a new road, you should know whether it is a road which by the best management can be made to pay at all, or whether it has been projected by some interested person for his private profit in its construction, and cannot be made to pay, and you are called to waste your energy and time in attempting an impossibility. The railway having been built and being in operation, is your particular department free from all blame for the disaster about us? The traveling, like every other portion of the community, seek ease and luxury. These parents of effeminacy they pay for with more willingness than they do for their railroad fare. They get a pass over a road if they can, and pay with pleasure for the luxurious sleepers or parlor cars. The public demand for luxury has created a rolling-stock as great in weight as it is delightful in ease. You know the cost of operating such rolling-stock; you know the weight of the locomotive required to move it; you know the excellent condition of the track indispensable to operating it at a high rate of speed with safety. Have you studied carefully to know whether the road with which you are connected can afford to be operated with this luxury, and at this speed? Are not lighter engines and cars, and a more moderate speed, essential to profit in operating many of our railroads? You reply that all this luxury and this great speed is no fault of the mechanical department; that it exists in consequence of a public demand, and that the public alone are responsible. The public is like a spoiled child in the matter; they take all the sweet they can get and cry for more. This calls upon you to exercise all your firmness and all your wisdom to put an end to a losing business, which you know must end disastrously. Let me beg every one of you, then, to renew your assiduity in these matters, and to do all you can to cause heavy rolling stock to be removed from the roads you serve, unless the traffic is so enormous and lucrative as to bear the expense it entails. Involved in this question of operating the rolling stock, for which you are directly responsible, is the cost of moving large bulks great distances, and selling them at a profit. I had the honor, very briefly, to call your attention to this point a year ago. All the injury to the railroad interest of the country which a misconception of this great question could do, has been worked within a year. It is hardly possible to overestimate that injury. It had its origin in something akin to fraud, perpetrated by those who projected and constructed railroads on the people of neighborhoods through which they passed. To obtain from the farmer pecuniary aid in way of donations, by representing to him that his bulky freight, in the shape of farm products, would find a high market and at a low rate of freight, was one unflinching financial resource of the projectors of these unnecessary roads. It was the hope held to the view of the honest and unsuspecting husbandman, built upon a foundation of misrepresentation and falsehood. It has borne the bitter fruit which might have been foreseen. The deceived farmer, finding the rate charged by the railroad did not bring him the promised market for his products, became a granger, the granger became a legislator, and treated the railroad interests of great States with arbitrary laws and enactments. To regulate trade, not by the law of supply and demand, not by the cost of doing the business, but by legislative enactment; to say that a railroad shall haul a ton of freight for one-half a cent when the absolute cost of hauling is one cent a ton, is as if you should require the farmer to sell his corn at 25 cents a bushel when he can realize 50 cents by feeding it to hogs; or, as if you should legislate him into a sale of his hogs at some particular place in the State at half their market value. This seems absurd enough; nevertheless, the granger, deceived into donating his money to build the railroad, legislates with the passion of resentment, not with the wisdom which follows calm reflection. In Wisconsin, the railroads complain that this legislation amounts to a confiscation of the railroad property. What doubt, what distrust, what absolute ruin overhangs a great commercial interest, thus threatened by hostile legislation! Again, gentlemen, I hear you ask me, "Is this our work? Did we build these roads? Did we deceive the farmer? Did we touch their donated greenbacks?" Not at all; but, gentlemen, you are the practical operators of these roads. The farmer does not seek a dry-goods clerk to till his fields or to gather his harvest. Every week, almost every day, we hear that the practical railroad mechanics are coming to the management of railroads. You should know the cost of operating these roads, and you should know how to operate them at the least possible cost, and it is the duty of every one of you, as you would protect the great commerce with which you are identified, to educate both granger and legislator as to the cost of transporting, so that they shall not do a great wrong to your traffic, any more than you would legislate them out of the true value of the products of their soil. The granger must be reminded that before the railway was constructed he had no market for his products beyond the distance they could be hauled in wagons and profitably sold. Whereas, he has now a much wider and better market, although not always the highest in the whole United States. He must be reminded that so eager was he for the construction of a railway near his farm, that he often solicited its building at a high cost rather than that it should not be built at all. Thus he became in a great measure responsible for its construction. He has no right now to shirk his share of the responsibility, least of all has he a right to legislate adversely to the interest he did so much to create. His best course is to protect the railway, to do all that he can to make it earn a fair interest on its true cost, for the prosperous road will be a

real benefit to his property, while a bankrupt road is a burden to him as well as its owners.

Gentlemen, among the other causes of embarrassment to the railroads, bearing directly upon it with a dead weight, is a question of the currency. I am not about to discuss a subject on which the ablest minds differ, and all men have strong opinions, not because it is not of vital importance, for if I had the ability to claim your attention on so great a theme, I feel I ought not to take your time for more than a passing reflection. Sound political economy, average common sense, and the inexorable teachings of history concur in showing that irredeemable paper currency is the greatest curse that war inflicts upon a nation. Its blighting influence is felt by the railway interest even more fatally than by any other. It furnishes the means to unprincipled speculators to build parallel lines and unnecessary roads. It is not too much to say that the railway business could not have been overdone to the extent it now is, unless the means had been furnished by irredeemable currency.

Gentlemen, I turn from this digression to other considerations which bear upon the present non-paying condition of railways. As practical men, most, if not all of you, competent to practically operate a railway, I ask you if it has been ascertained yet that a steel rail is a necessity? If a better iron rail were made, involving but slightly increased expense, would the steel rail be required? In this question is involved the cost of producing a first-class iron rail in this country. The cost is by no means as low as it should be. The coal and iron miners of this country, unfortunately for the welfare of the railroads, attempt to enjoy an annual strike. They attempt this carnival with such regularity that they are obliged to earn in six months enough to sustain themselves and their families a year. They would make better citizens, form better communities, earn more money at a lower rate of wage, and produce double the quantity of iron and of a better quality, if they worked all the year round. And then, I ask you would there be any need of steel rails? If there is no need of steel rails, the cost of a first-class road would be materially decreased thereby, and a lower rate per passenger and per ton of freight would suffice for the interest on that cost.

Gentlemen, while we call on the laborer in the mine to be sober, industrious, skillful, and continuous in work, we must not shrink from considering how far our own labor, and the labor which we employ, has been at a rate so high as to materially interfere with operating the railroads of the country at a proper cost. A widespread extravagance of living has prevailed throughout the country since the war. If this is one of the causes of the high price of labor, and if through it disaster is to succeed disaster to the railroads of the country, every hour that the day of reckoning is put off only makes that reckoning more certainly necessary, and that ruin more general. It is our duty, therefore, to look the question squarely in the face, and to take those steps which prudence and wisdom demand, that our part in meeting a question so delicate and so full of difficulty may at least be fully and fairly done.

Gentlemen, we are in the city of Chicago. Out of the lurid flames of its terrific fire, from dust and ashes it has risen, and now spreads itself out in beautiful and magnificent proportions. History furnishes no parallel to this magical creation. The world has never before furnished a people with such unbounded enterprise and faith, supported by a country of such fertility and resources. You have everywhere seen the welcome it holds out to you for every enjoyment, and from what I know of you, I believe you will, with becoming modesty, not fail to avail yourselves of its pleasures; but do not forget that here are to be found some of the most modern and interesting applications of the mechanical arts to every necessity and luxury of civilization. Let these attractions claim from pleasure some of the hours which will not be required to attendance here.

Gentlemen, it may seem to you that the facts I have cited and the trouble I have pointed out give too unfavorable a view of the industry in which we are engaged. I have not sought to be unhelpful or a prophet of ill. Indeed, I have every confidence in the prosperous future of the railway interests of the country, if all connected therewith do their duty; and it has seemed to me that on an occasion like the present, where the whole subject is legitimately before me, I should fail of my duty did I not point out, to the best of my ability, what seems to me the causes of the present difficulties, and suggest some means of overcoming those difficulties, leaving to you all those hopes which spring spontaneously to the mind, whenever it is suffered to dwell upon an industry which is as wide as the continent over which it is spread, and of which it may well be predicted that its growth and prosperity will go hand in hand with the prosperity and power of the countries it does so much to develop.

Gentlemen, the critical condition of the railroad industries at the present time, the ignorance and misapprehension which exist upon all the subjects involved in moving large bulks great distances, at any reasonable cost, the necessity of enlightening the public mind, and awakening the public reason to the truth upon these subjects, render this an eventful era in the history of railroads.

Here in the commercial capital of the State where the granger was first maddened into legislating upon rates and tariffs of freight, without reference to the cost of transportation, it is eminently fitting the first steps should be taken to guide his footsteps toward the paths of reason and justice. This will require patience, good temper and forbearance, because the enactments of folly are precipitate and easy, while the resolutions of wisdom are slow and difficult.

SECRETARY'S REPORT.

The report of the Secretary, being called for, was read, as follows:

H. M. Britton, President American Railway Master Mechanics' Association:

DEAR SIR:—I herewith hand you my official report for the year ending May 12, 1874. Money received during the year is as follows:

By assessment.....	\$2,150 00
By donation.....	55 00
Initiation fees.....	32 00
From Naval Bureau.....	1 50

Total amount of money received, \$2,238.50—an excess over that of last year of \$171—which has been turned over to the Treasurer and receipts taken for the same.

Since my last report 32 members have joined the Association. Of these 26 became members at our annual meeting in Baltimore, and six by authorizing their names to the constitution, as provided for in Article 4.

During the year eight have requested that their names be taken from the list of members. Of these, one resigns on account of his name being omitted from last year's report, one on account of not being able to pay his dues, three on account of leaving the business, one from not being able to attend annual meetings, and two have assigned no reason.

In thus referring to the history of our membership, it may not be out of place to call your attention to the fact that one of our number, who has been an active member of our Association since 1869, is also one whose name will be stricken from our rolls. I refer to J. B. Gale, who died at Raleigh, N. C., April 7, 1874. Another, J. B. Pendleton, although not a member at the time of his death, withdrew only because he felt the Association was not properly appreciated and there was no encouragement to remain. This feeling was no doubt caused, in a great measure, by the disease which ended his life, for he, too, is dead, and his name deserves honorable mention

among members of our profession. This leaves our number with an increase of 26 compared with last year, making the total membership 243. Very respectfully submitted.

J. H. SETHCO, Secretary.

The report was received.

TREASURER'S REPORT.

The report of the Treasurer gave the following statement: Balance fund and cash from Secretary, \$2,361.24. Expenses of year and balance on hand, \$2,361.24. The balance on hand is \$238.93.

Received and filed.

THE FINANCE COMMITTEE

reported the accounts of the Secretary and Treasurer for 1873 correct, and recommended an assessment of \$10 to defray the expenses of the current year.

Received and filed.

CORRESPONDENCE.

All local correspondence for the consideration of this Convention was referred to the Supervisory Committee for consideration and action.

DUES.

A committee for the collection of dues was appointed, in accordance with the suggestion of the Finance Committee, consisting of the Finance Committee itself, viz.: Messrs. Garfield, Graham and Richards.

BOILER MANAGEMENT.

The Committee on the Operation and Management of Locomotive Boilers presented a very long report. The report discussed:

1. Incrustation, its causes, effects and cures.
2. The deposit of sediment, its effects and remedy.
3. The impurities in water which produce priming, its effects, and only remedy.

The report quoted extensively from a paper read by Dr. Jos. G. Rogers, on steam boilers, waters and incrustation, in 1871, before the American Association for the Advancement of Science. Dr. Clark's process for purifying water for locomotive use was given in detail. The Committee reached the following conclusions:

Your Committee still believe that the only certain and reliable mode of overcoming this evil is to purify the water before its introduction into the boiler, and from their investigations, viewing the case as it now stands, they are prepared to recommend the following general rules:

1. The purest water should at all times be selected. That which contains the least impurities which form incrustations, rain and surface water, is especially recommended whenever it can be gathered to advantage, and means provided for settling, or filtering, so as to prevent the deposit of mud and other floating impurities in the boiler.

2. Owing to the fact that no panacea can be found for all the incrustation diseases, it is evident that if it is to be cured by remedies at all, a diagnosis of each case must suggest the proper treatment.

3. That each railway company interested should submit a specimen of the various kinds of water along its line to an expert, who shall confine his examination to the deduction of the injurious substances, and not to the purification of it, beyond the necessity of the case in question. For some years the Pennsylvania Railroad, and also the Reading Railroad, have found it advantageous to submit the water to an expert, who tests for certain things only, and frequently a well pronounced unsuitability is abandoned, and one dug near by may prove better adapted to the purpose. Each case requiring a remedy must likewise bear its own testimony.

4. That a committee of three, consisting of two members of the present committee and a competent chemist, be appointed by this convention to confer with one or more railroad companies with a view to a practical trial of both Dr. Rogers' and Dr. Clark's process of purifying water for locomotive use, the expense to be borne by the company receiving the benefit.

5. That reliable boiler compounds may in bad cases of scaling be used to advantage, when the circumstances are such that the water cannot be easily purified before entering the boiler. This treatment must be followed up with frequent and thorough washing, otherwise little, if any, benefit can be expected.

6. We find that many suffering from incrustation and mud advise the use of the mud drum. Mr. Peddle, of the Terre Haute & Indianapolis Railway, thinks a hand-hole, as represented in drawing, which he has used for some time, is equally as good as a mud drum, and much cheaper; but your Committee are inclined to favor the cast-iron drum, now in successful use on the Hannibal & St. Joseph Railroad, as shown in drawing, on account of the benefit derived from the use of the blow-off cock, besides affording a convenient access to the boiler while undergoing repairs.

In order to keep the cylinder part of the boiler clean, the blow-off must be used daily; also blow-outs in leg and other parts of the boiler should be kept in order and used often. Crown bars should have at least one-inch clearance above the sheet, and should be fastened without thimbles.

HORACE A. TOWNE,
Chairman of Committee.

DISCUSSION.

The discussion of the paper was called for, after a brief recess.

Mr. Sedgley, of the Lake Shore & Michigan Southern, offered the following, which was adopted:

Resolved, That the President appoint, as early as possible, a committee on subjects for consideration during the coming year, and any matters suggested to be reported to said committee before 2 p. m. to-morrow.

The chair appointed as such committee Messrs. Sedgley, of the Lake Shore road, M. N. Forney, of the RAILROAD GAZETTE, and John Thompson, of the Eastern, of Massachusetts.

Mr. Towne, from the Northern Pacific, moved that the discussion of the report be postponed until 9 o'clock the next day, in order to allow a paper on the subject, by Dr. Rogers, to be read.

SAFETY-VALVES.

The committee on the best form of safety-valve, or methods of relieving boiler overpressure, and the best way of testing pressure-gauges, presented a detailed report, of which the following are the salient points:

In reply to the circular sent, 25 answers were received, and these showed considerable diversity of opinion in regard to the questions submitted.

L. H. Waugh replied that he prefers attaching both valves to the forward dome when an engine has two, but a general preference was expressed for one lever and one direct spring valve located on the dome-cover over the fire-box.

Those who expressed objections to lever safety-valves, based them on their liability to be tampered with by the engineers; their tendency to rust and corrode at the joints of the lever, which causes them to stick; an insufficient range of the spring by which the motion of the valve is restricted, and the liability of the roof of the cab to interfere with the free motion of the rod on the end of the lever.

The expression of opinion in regard to direct spring valves was, with few exceptions, in their favor. The grounds for this preference were stated to be their compactness and simplicity, the quick relief which they afford to an excess of pressure, their prompt closing when the pressure falls, and the fact that they are or may be made independent of the control of the engineer.

Mr. A. Robinson objected to them because "they become corroded from inaction."

James M. Boon said: "I have never seen any advantage in a direct-action spring valve. The disadvantages are: They are easily tampered with, and troublesome to keep adjusted when steam comes in contact with them."

To the fourth question the answers were, with very few exceptions, to the effect that no injurious lifting of water was caused by the use of the Richardson valve, this valve being selected because its sudden lift or "popping" is more violent than other valves.

To the fifth question the replies showed a considerable diversity of opinion—S. M. Philbrick being satisfied with two valves, each $2\frac{1}{2}$ inches in diameter, while A. Gould prefers two valves, each 4 inches in diameter.

To the sixth question the answers were mostly in the negative.

PRESSURE-GAUGES.

The same committee, which also had under advisement the best form of pressure-gauges, reached the following conclusions, which are given in brief:

Three questions were propounded in the circular of the committee. To the first one, "What is your method of testing pressure-gauges?" a large majority replied, "By the ordinary hydraulic pump and test gauge."

To the last question propounded, "What make of gauges gives you the best satisfaction?" and state the advantages of the same," the expressions of opinion were about equally divided among the kinds of gauges in general use. R. Wells was of the opinion that "all are so nearly alike that I cannot tell any difference—all are poor enough."

In addition to the circular to the members of the Association, a letter was addressed by the Secretary to each of the prominent makers of steam-gauges requesting such information in regard to the manufacture, operation and mode of testing their gauges as would be of service to the committee in making out a report. A few responses were received, little of which could be used by the committee.

EXTRA SESSION.

Mr. Robinson, of the Great Western, arose to state that many of the reports to be presented, in the hands of the Supervisory Committee, were of great length, and that in order to read them an extra session would be necessary. He moved an extra session be held in the afternoon from 3:30 till 6 o'clock. The motion prevailed, the session to be held in the club-room of the Sherman House.

DISCUSSION.

Mr. Coleman Sellers, President of the Franklin Institute, of Philadelphia, said, with regard to those safety-valves that open with an explosion, that by covering them with a perforated cap, like the top of a pepper-box, this would be avoided. He cautioned against the use of nickel under the impression that it would not rust. His experience indicated that the iron would rust underneath the nickel-plating.

Mr. Towne, of the Northern Pacific, inquired if anyone knew of the Anderson valve having rusted. That was in use on his road, and had never been known to rust.

Mr. Peddle, of the Vandavia Line, said that he had found it to rust in the spring. He favored the Richardson.

Mr. Robinson was pleased to know of a covering for the Richardson valve, which was a nuisance without it, and had killed many horses and people, bringing gray hairs to many heads. He had been frightened by it himself, going off with a sudden "pop." A valve was in use on the Great Western, of which he had a tracing, free to the use of anybody, which had all the advantages of the Richardson, and costs little or nothing for repairs.

Mr. Peddle asked if the valve had been thoroughly tested. Mr. Robinson said it had been, in working and by urging the fire.

Mr. Farris, of the Atchison, Topeka & Santa Fe, found it impossible to make the Richardson work as he wanted it. Firstly, on account of the noise; and, again, because he could not regulate the pressure. They had, therefore, got up a new valve, in which the angular flange was increased, and which worked well. He had adopted the plan of putting one valve on the forward dome and putting a cap over it, which deadened the noise, and carried 127 pounds. The spring acts quiet, and when the valve rises, the heat of the steam decreases the weight of the spring, which is not the case with open springs. He also used a lock valve. It was different from anything he had ever seen. It did not increase one particle with the blower on.

Mr. Hudson, of the Rogers Locomotive Works, thought the "pop" valve was a nuisance that ought to be avoided, and thought all the noise could be got rid of. There is another patent that covers the principle of the Richardson—the Naylor—so that there are in existence two patents concerning the same thing. He had seen Mr. Robinson's gauges, and was pleased with them. The Naylor is an English invention, and patented here. He thought some who paid for using it might be sued for infringing on the Naylor.

Mr. Forney, of the RAILROAD GAZETTE, asked for information about the workings of the Richardson valve. The grooves or curves in the valve were the principal objects of inquiry.

Mr. Elliot, of the Ohio & Mississippi, had used a plain-seated valve which would act similar to the Richardson, and explained the use of each. The Richardson would not vary as much as any other common-seated valve. In regard to the "popping," if properly set, and the engineer and fireman attended to their duty, it could be avoided.

Mr. Peddle said the committee did not investigate the patent matter. They selected simply what they deemed the best valve. The merit of the valve is in the grooves. He had experimented with a valve similar to the one spoken of by Mr. Farris, and it did not work satisfactorily.

Mr. Hudson said another feature was the length of the spring. The spring on what is called the "Ramsbottom" valve is longer than that in common use here. What is the best length?

Mr. Elliot said there was an opening in the Richardson, which had to be very fine to be made to work right.

Mr. W. H. Ellis, of the Chicago, Rock Island & Pacific road, was using a still different valve. The Richardson, after being in use a short time, allows too much steam to escape.

The hour of 2 o'clock having arrived, the convention adjourned, to reassemble at 3:30 p. m. at the Sherman House.

TUESDAY'S SPECIAL SESSION.

The convention assembled at the club-rooms in the Sherman House at 4 o'clock, and was called to order by President Britton.

MECHANICAL LABORATORY.

The report of the Committee on Mechanical Laboratory was called for and read by the Secretary.

Previous to its reading, Mr. Robinson, of the Great Western of Canada, desired, as Chairman of that Committee, to make an explanation. The Committee, during the compilation of the report, had a correspondence with Prof. Thurston. Since arriving here they learn that Prof. Thurston has made arrangements with the Stevens Institute for the establishment of such a mechanical laboratory, of which the Committee knew nothing. He (Professor Thurston) had also prepared a paper to read on the same question.

The Secretary read the report of the committee. It embodied in elaborate detail the following points:

APPARATUS FOR LABORATORY.

1. Adjustable model of valve motion.

2. Machine to test tensile, torsional and compressive strength of metals.

3. Machine to test friction of metals.

4. Machine to test lubricating value of oils, etc.

5. Steam-engine indicator, with full diagram apparatus.

6. Most approved speed or revolution counter.

7. Pyrometer for testing high boiler temperature.

8. Thermometer with long range.

9. Vacuum gauge for use in locomotive smoke-boxes.

10. Mercurial column for testing steam gauges.

11. Registering dynamometer for obtaining train resistances.

12. Microscope for the examination of metals.

13. Means of testing calorific value of different classes of coal, and principle of their most economical combustion.

14. Means of testing various qualities of water.

15. Means of testing acids in tallow under high temperature.

16. Means of testing incrustation compounds, and discovering their injurious ingredients when any.

17. Means of testing composition of specimens of boiler scale, etc.

In further treating of the matter, the Committee divided the subject into three divisions, as follows:

Organization of Laboratory.—The Committee recommend a system embodying all that is valuable in the above suggestions, namely, that, if established, the laboratory should be accessible at all times by members of a standing committee or by any member of the Association.

Location of the Laboratory.—Members of the Association have recommended as the location of the laboratory New York, Chicago, Cincinnati or Philadelphia.

Financial, or Ways and Means.—The Committee recommend as a plan of support such an institution, to call upon the different railway companies of the United States and the Canada to contribute *pro rata* according to the number of engines owned.

PROF. THURSTON'S REPORT.

After reading the above report, the Committee tendered to the Convention a paper prepared by Prof. Thurston, upon the same subject, which covered about the same points as the former, and desired that it be embodied with the regular report. On motion, it was carried.

DISCUSSION OF REPORT.

Mr. Robinson asked Messrs. Forney and Sellers, who were intimately acquainted with Professor Thurston, what control the Association would have over the funds if they were contributed to the proposed laboratory. They had on hand something over \$3,000 from the "Boston fund," and it was important that they should be prudent in expending it.

Mr. Forney replied that he had every confidence in Professor Thurston and the Stevens Institute, and he thought the funds would be well and safely invested if placed in their hands.

Mr. Sellers, like Mr. Forney, thought Professor Thurston and the Stevens Institute worthy of the utmost confidence. Professor Thurston he considered better fitted, perhaps, than any other civil engineer in the country to make the affair a success.

Mr. Eddy was opposed to engaging in the enterprise either by individual contribution or as an association. The apparatus suggested by Professor Thurston was not what railway mechanics required, and they would derive no benefit from the laboratory. It might be advisable for the railways to organize such an institution, but an association composed of members whose interest was only secondary, and who were liable to withdraw from membership at any time, was scarcely called upon to invest money in the enterprise.

Mr. Sellers agreed with Mr. Eddy. They were an association composed of men who were members simply because they were of the same profession, and who were liable to withdraw at any time. Being scattered over a vast country, they could not have the same interest in such a laboratory as did the Stevens Institute, which was settled at Hoboken. It would, therefore, not be wise to enter into the project.

Mr. Eddy had no hope that the railways could be induced to contribute. They had refused to give passes to the members who came to the convention, and when they refused that they would not be likely to pay out money for a mechanical laboratory.

Mr. Robinson said it would only cost at the rate of a few cents per locomotive, and the saving which the increased information they could gain from a laboratory would enable them to make would be so greatly in excess of the expense that they could scarcely refuse to contribute.

Mr. Jackson, of Chicago, thought that the numerous published works, together with the experiments always being made, rendered the establishment of a laboratory unnecessary.

Mr. Hudson said new metals, new combinations of metals, and new qualities were constantly on hand to be tested, and for this work alone the laboratory was necessary.

Mr. Forney moved that the discussion be closed, and made a special order for 12 o'clock the next day.

The motion was carried and the convention adjourned.

WEDNESDAY'S SESSION.

The second day's session was called to order by President Britton at 9 o'clock in the morning. The attendance was much larger than on the opening day, 30 new members having joined the Association, making the total number present 114.

BOILERS.

The discussion of the report on "The Operation and Management of Locomotive Boilers," including the Purification of Water," was announced in order. The report of the Committee upon the above subject was made on Tuesday, but the discussion was deferred to allow the reading of a paper upon the question by Prof. Rogers. The paper of Prof. Rogers was then read by that gentleman. It treated more particularly of the incrustation of engine boilers caused by the sediments formed from the use of impure water for the generation of steam. The ideas of the gentleman were practically illustrated by a series of experiments, which were made in the presence of the members of the Convention.

In investigating the subject of steam-boiler incrustation, the Professor said it would be necessary to consider the chemical constitution of natural water, the source from which all scale-forming elements are derived. Pure water consists of the two gases, hydrogen and oxygen, in chemical combination. It holds nothing in solution or suspension. Water, as found in nature, however, is never chemically pure. By contact with the earth's surface, and by percolation through its alluvium and rocks, more or less mineral matter is dissolved, or carried away in suspension of a mechanical nature. Even the rain-drop brings with it from the clouds a certain amount of gaseous matter, acquired by absorption in its passage through the air. By reference to tables it will be seen that sea-water contains $2\frac{1}{2}$ per cent. of saline matter in solution, about 25,000 grains per gallon; that of the Dead Sea $16\frac{1}{4}$ per cent. River and lake waters contain from one to 20 grains of solid matter per gallon, in solution, and a varying quantity in suspension, generally exceeding 10 grains. Well and spring waters hold but little in suspension, but in solution a quantity varying from 10 to 150 grains. The relatively greater proportion of salt in the sea is due to the fact that it has been since the beginning the great reservoir for all the waters that wash the earth, and that, by constant evaporation, the evolution has become more and more concentrated, the pure watery vapors going back to the clouds, to fall again as rain and run into the sea loaded with new saline increments. Beside these

mineral substances, more or less vegetable matter is found derived from the same source.

The evil effects of scale are due to the fact that it is relatively a non-conductor of heat. Its conducting power, compared with that of iron, is as 1 to 37.5.

To obviate the evils from incrustation, which include danger from explosion, expense of repairs, loss of time and waste of fuel, very many methods have been devised, having in view the prevention and removal of scale. These plans have generally proved unsatisfactory.

Various mechanical contrivances have been, and are now, used to intercept the precipitated saline matter from the supply water on its passage through the heating apparatus. They consist, essentially, of a series of obstructions to the flow of the water. This latter being heated to a boiling pitch, by being intermingled with the exhaust steam in the heater, the carbonic acid is driven off, and a precipitation of the carbonates takes place, the deposit accumulating on the shelves, straw, or other obstructions, over which the water slowly flows. In this way large accumulations of the matter in suspension, and of the precipitated carbonates, are prevented from going into the boiler, and, being retained in the heater, may be removed very conveniently when opportunity is afforded. This plan, however, only partially remedies the difficulty.

Another variety of mechanical device for preventing scale is the sediment pan. This plan succeeds in gathering much of the sediment, but much necessarily fastens itself to the boiler, and the scale, as before, continues to form.

The speaker thought it impossible to make any mechanical contrivances completely efficacious. The great desideratum—perfect prevention—cannot be attained by any mechanical means. To chemistry alone can we look for a complete method. For a long time simple chemical agents have been used in an empirical way with a certain success. Some of them are dangerous in their use, and of course their use should be forbidden. Tannate of soda he thought is the agent which perfectly fills the demand theoretically, and in an extensive trial in all kinds of waters had proven its practical efficacy.

DISCUSSION ON THE PAPER AND REPORT.

Mr. Towne stated that the compound invented by Prof. Rogers in use would cause as much sediment to form on the inner portion of the boilers as the usual incrustation from hard water, and would be as difficult to get rid of, and felt that the theory proposed was no more practicable than the others which had already been put forward.

Mr. Jackman, of the Chicago & Alton, introduced to the audience Prof. S. S. Sewell who, upon motion, was requested to state his opinions upon the subject.

Prof. S. S. Sewell had studied French, German, English and American authorities upon the subject, and had found that the universal result was the same—an alleviation of the formation of sediment in boilers, but the scale had never yet been done away with entirely. Unless the water was purified of the deleterious matters which have caused the incrustation, previous to entering the boilers, there was no relief possible.

Mr. Coleman Sellers, of Philadelphia, stated that some authorities contended that sulphate of lime prevented the settling of sediments, and cited instances in corroboration.

Prof. Rogers stated that some compounds of tannate of soda were now before the public, which differed materially from his method.

Mr. F. B. Miles, of Philadelphia, had experienced in using water from the Schuylkill River in an upright engine, that ingredients had formed a crust one-eighth of an inch thick in the boiler, and the use of carbonate of soda had cleaned it away inside of two weeks, and had kept it clean ever since.

Mr. Jackman, of the Chicago & Alton Railroad, had used lake water in an upright engine in Chicago which had caused a formation one and one-half inches in thickness on the interior of the boilers, and had afterwards used a number of compounds which had acted variously upon the sediment, but the tannate of soda acted as satisfactorily as any of the others. But was the use of any of the compounds necessary? He did not think so, as appliances were possible to carry off the different thicknesses of sediments, and the compounds proposed had formed other sediments which were hard to get rid of.

Mr. Jeffrey, of the Illinois Central Railroad, thought that a filter and heater combined with an engine would be the simplest mode of taking off the sediment, and was of the opinion that the cost of using compounds was altogether too expensive a luxury to be indulged in.

Mr. Woodruff, of the Central Railroad of Iowa, inquired of Mr. Jackman the nature of his compound.

Mr. Jackman explained. Mr. Woodruff said that what would precipitate in no kind of water would not in another. He found different kinds along his line, and was obliged to use different compounds. Lately he had been using sal soda alone, and found the deposits less than before.

Mr. Jackman had used 20 different compounds, thoroughly, particularly in the case of the two last. While some of these work well in one place they will not in another. He had no great faith in boiler compounds to get rid of scale. If one was found that would do it, it would take so much that it would cost more than to clean the boilers in the old way. Boiler compounds were like a certain patent cholera medicine—it might cure a mild case of diarrhoea, but would not be worth a penny for cholera.

Prof. Rogers thought that it made not a particle of difference, in the purification of water, whether it was in the boiler or out.

Mr. Hudson, of the Rogers Locomotive Works, agreed with the idea of purifying the water before used where practicable. But as all are aware, there are many roads where that is impracticable. Then some chemical or mechanical means must be used. The scale loosened, the sediment ought to be removed by some mechanical process, so that the matter can be got rid of as fast as the water evaporates. In Cuba, mud collectors have been placed in many boilers, so that the water passes through them, but the mud is caught.

Mr. Jeffrey, of the Illinois Central Railroad, asked if any estimate had been made as to the cost of purifying the water before it entered the boiler. The question is, which is the cheaper process—that or the compound?

Mr. Towne, of the Northern Pacific Railroad, said the expense was clearly stated in the sixth annual report. Concerning the deposit of sediments, he had some statistics. As for compounds, he supposed every one knew that there were compounds that would dissolve any incrustation. The question is, does this remove the difficulty? He claimed it did not. He referred to a report of inspection by the Hartford Boiler Insurance Company. Put your compound into your boilers and soften the scale, and what good does it do if not blown out? Do the engineers open the blow-cocks and blow out the boilers every day? He knew they did not. And why? Because the master mechanics do not enforce the rules. He had within the last three months discharged men for failing to comply with that order. As for cleaning out the boiler, it can't be done without taking out the flues. There was not a road in the country that could spare their engines from the track for this purpose, except it might be the Northern Pacific, which had more than 40 engines lying idle. There is no question about the action of boiler compounds. Mr. Towne submitted drawings showing the action of a compound.

Mr. Jackman, of the Chicago & Alton Railroad, had a corps of boiler washers at every place where they had engine-houses. He explained the mode of washing boilers, as practiced on

his road. No engine is run more than a week without this washing.

RECESS.

The Chair stated that the hour of 12 had now arrived, and, pursuant to resolution adopted on yesterday, it would be proper to take a recess and then proceed with the laboratory discussion. Recess for ten minutes was accordingly taken.

MECHANICAL LABORATORY.

The Convention having been called to order, the discussion of the mechanical laboratory was opened.

Mr. Setchel moved that the report of the committee be divided, and the paper of Mr. Thurston laid on the table for one year.

Mr. Chapman asked if that would not prevent the printing of the report.

Mr. Setchel—I would then modify my motion, by making it to defer action on that paper for one year.

The modified motion was adopted.

Mr. Robinson moved that the votes recommended by the Committee be also postponed for one year.

Mr. Setchel thought it desirable that at this session the members at least express their views as to the feasibility of the proposed laboratory.

Mr. Robinson did not wish to postpone discussion. He wished to prevent the Convention from committing itself.

Mr. Jackman, of the Chicago & Alton Railroad, expressed the opinion that the laboratory was a valuable thing, but that it might be impossible that it could be so located as to be valuable to all the roads represented in this Association. There were many things to be taught in such a laboratory. The use of the dynamometer and the other apparatus, if in New York, would not be feasible to roads in the West. In testing the strength of woods or iron or the power of locomotives, the dynamometer would be only available to roads near it. No better results, then, would come than those already before the body in printed tables.

Mr. Hudson might say, with regard to testing apparatus, the railway interests of the country were much larger than those of private enterprises that employ chemists. It is true access can be had to printed tables, but that is not what is required. Apparatus is wanted by which all the material can be put to practical test. Great railroads, like the New York Central, ought to have the necessary apparatus belonging to their road. And the Master Mechanics' Association ought to have it. In the long run it would pay.

Mr. Coleman Sellers said such a laboratory would be of great value to the general public. But the changeable nature of the membership of the Association was an objection. He thought careful inquiry should be made concerning similar institutions elsewhere. He pointed out objections, and hoped there would be no hasty action.

Mr. Jeffrey, of the Illinois Central Railroad, said his road made it a habit to occasionally test different material, and had very simple arrangements for making such tests. They tested iron and steel in the wheel-press. Oil was examined and tested in the shops. He thought all important railways should have instruments.

Mr. Hudson said that while experiments for testing the tensile strength of iron by the ordinary hydraulic press might do well enough, he knew it was not reliable.

Mr. Jeffrey said, by way of explanation, that the gauge of their hydraulic press had been tested.

Mr. Hudson had never seen a reliable hydraulic gauge.

Mr. Elliott, of the Ohio & Mississippi Railroad, thought it a great question whether the experiments made by master mechanics, in a rough, practical way, were not of more benefit than the fine ones of a laboratory. He came to hear the different experiences of master mechanics, and could see no good results to come from this not to be obtained by individual efforts on roads. He did not come here prepared to pay for mechanical or chemical laboratories. He did not think the practical workings of the roads needed the laboratory.

Mr. Woodruff, of Iowa, agreed with Mr. Elliott. He came for information as to the best way of taking care of an engine. Mr. Hudson thought that the business of the master mechanic involved more than mere mechanical business. The whole question of the construction and use of a locomotive was chemical and mechanical.

Mr. Elliott admitted that it was all chemical. But if he wanted information about it, he would ask Mr. Hudson, and he would tell him. All these tests had been made, and why not take the benefit of others' experience. All master mechanics were to a certain degree chemists, but did not care to know about the fine points of chemistry.

Mr. Woodruff agreed with Mr. Elliott. These were all practical men, and willing to take advantage of the experience of others.

The discussion here wandered into the merits of case-hardening.

Mr. Chapman moved that the matter of a mechanical laboratory be postponed for one year. Also, that it be reported back to the committee who had it in charge last year.

The motion prevailed.

MORE ABOUT BOILERS.

Mr. Robinson arose to say that Mr. Towne had probably made a mistake in his statement that few railroads had sufficient engines to allow the frequent washing out of boilers. A railroad which had not was derelict in duty to its stockholders.

Mr. Towne thought all Western men would bear him out in saying there were occasions for months at a time on Western roads when business would not allow the stoppage of engines.

Mr. Salisbury, of the St. Louis & Southeastern, made a statement in regard to the reservoir system in use on his road. They were a necessity there, as none but rain-water could be had. Scale was a thing unheard of. They don't know what scale is.

In answer to an inquiry from Mr. Robinson, Mr. Towne said the blow-off cock ought to be used every day, or oftener, when there was a full head of steam on.

Mr. Robinson moved a vote of thanks to Dr. Rogers and Prof. Sewell, for the information they had given. Carried.

REPORT OF COMMITTEE.

The report of the Committee appointed "on the Consumption and Cost of each Kind of Fuel Used, per Mile Run, per Weight of Train Hauled, including Cars; also, the Best Form and Proportion of Tube and Fire-box Heating Surface, and Grate Surface Requisite to Produce the Best Results with each Kind of Fuel," was then read, which is substantially as follows:

TO THE AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—Gentlemen: Your committee on the above subject regret to state that they have received but seven replies in answer to their circular of questions, issued to the members of the Association, and are, therefore, unable to make a report therefrom that can prove worthy of the subject, or of interest to the Association.

It is but fair to state that perhaps our members, who are at present actively engaged as railroad master mechanics, are not entirely to blame for this seeming negligence on their part, when we take into consideration the fact that but few of our railroad companies allow their master mechanics to provide the necessary means of obtaining practical and therefore valuable information on this important subject of fuel.

It is true that to obtain such information would entail additional expense, as accounts must be kept for each locomotive, of the kind, quantity, and cost of fuel used, the actual mileage

made, the weight of train hauled, etc., and the comparative results computed therefrom. It is evident, however, to any who have given the subject their consideration, that with a thorough practical knowledge of the matter, a saving, at least in the cost of fuel, would be a certain result, and to an extent that ere long would much more than compensate for the expense incurred to gain such knowledge.

The Committee would recommend that the subject be continued another year, and that it be placed in the hands of two separate committees.

Received and filed without discussion.

BOILER EXPLOSIONS.

The committee appointed to investigate boiler explosions made a partial report. Mr. H. L. Brown, of the Committee, had visited Sandy Hook on October 25 last, and gave the result of experiments witnessed. The experiments took place on November 27, and were published at that time, nothing new having been developed.

Mr. Chas. Kerr, from the same Committee, gave details of the same experiments.

The experiments which were to have been made at Pittsburgh were very incomplete and unsatisfactory. The experiments, however, are to be continued this season, and the Committee urge a general attendance.

On motion, the report was re-referred to the Committee.

A LAKE EXCURSION.

The Chicago friends of the master mechanics did all in their power to make the visit of the members as pleasant as possible. On Tuesday afternoon they were tendered a trip on Lake Michigan, in the Goodrich steamer Muskegon. The handsome propeller lay at her dock, near State street bridge, at a little past two o'clock, and the members went on board in company with their ladies and friends, and indulged in an elegantly prepared lunch. To the strains of a band of music the touring party passed down the river, and on their way toward Evanston looked in upon the man at the crib. After a further trip northward, and then down to South Chicago and Calumet, the excursionists returned to the Sherman House, about 6 o'clock, in good time for a late dinner. The trip was thoroughly enjoyed by all.

THURSDAY'S MORNING SESSION.

The Association assembled in regular session, at 9 o'clock President Britton in the chair, and J. H. Setchel, Secretary, acting.

MR. COLEMAN SELLERS' PAPER.

The President announced that at a former session, a Supervisory Committee had been appointed to solicit from associates members papers upon scientific subjects. As a result of their efforts they had the pleasure to announce a communication from Mr. Coleman Sellers, President of the Franklin Institute, of Philadelphia, which that gentleman immediately read to the Convention. The subject as announced by Mr. Sellers was the "French System of Measuring, Known as the Metric System."

This paper, which is an exceedingly interesting one, we will publish in full hereafter. It investigated the cost of making a radical change in the standard of measurement at this time, when the use of machine tools, gauges, etc., is universal, estimated the cost of changing and renewing the stock of an establishment equipped for 250 machinists at not less than \$27,000 without any change in drawings, and the complete change at not less than \$150,000. Mr. Sellers concluded that the adoption of the metric standard in this country is now neither practicable nor desirable.

After the reading of the paper, the Convention ordered it to be embodied with the full report of the session when printed, and a vote of thank, was extended to its author.

SUBJECTS FOR NEXT YEAR.

The committee appointed to prepare subjects for discussion at the next meeting presented the following:

1. The best material, construction, operation and management of locomotive boilers.
2. Purification of feed water—what methods up to this time have been most approved for the improvement of feed water by chemical and mechanical means, and for the prevention of incrustation.
3. Locomotive tests. This committee to request members to make experimental tests to show the performance of locomotives, and to report the results to this association.
4. Locomotive construction. This committee to report as far as possible all new methods of construction which have been adopted by members during the past and ensuing year.
5. The best system of signals for operating railroad trains, to include train head signals, train tail and side signals, road or station switch signals, and appliances for indicating the speed of trains.
6. Locomotive and tender wheels. This committee to report breakages of wheels and tires, removals of tires, and causes of breakage or removal, and to report on the different methods of construction and manufacturing of various kinds of engine and tender wheels.
7. Construction and improvement of continuous train brakes during the ensuing year, and their application to cars and locomotives.
8. Lubricants for locomotives.
9. Mechanical laboratory.
10. Finance.
11. Trustees of Boston fund.
12. Printing.
13. General supervisory.

VALVES AND VALVE GEAR.

The Committee on Valves and Valve Gear presented a long report. Fourteen members responded to the circular sent out by the committee, from which the following conclusions are deduced:

"Of the 14 members answering to the circular, four report in favor of balanced valves and six against, while nearly all agree that there is a reduction in wear of seats and gear, and increased ease in handling. The grounds of objection are liability to blowing and difficulty of keeping in repair. The mileage of the balanced valve, where comparisons have been instituted, is considerably in its favor, as against the flat valve. Seven replies are in favor of decreasing the size of parts, from their experience, and two offer simply an opinion against reduction."

DISCUSSION.

Mr. Hudson, of the Rogers Locomotive Works, said the subject was of much importance. Experiments had been made by the United States Government officials, showing that, while the parts might be diminished to half their size, the passages could not be reduced. He was not favorably impressed with balanced valves.

Mr. Jackman, of the Chicago & Alton, believed that committees were appointed, and served to the best of their ability, and sometimes it had been said too much time had been spent in discussion. But what the Association wanted to get at was actual experience with balanced valves. First, with the Adams valve. If it had been in use three years, with good results, and was not costly in wear. The men who handle those engines say that they handle easily. They have worked well. He had also tested Mr. Elliot's valve—had it on six engines. But he had not taken up one since they were put in, so he could not say much about them. But he had put one on an engine without telling the engineer, and he had not noticed any differ-

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Editorial Announcements.

Addresses.—Business letters should be addressed and drafts made payable to THE RAILROAD GAZETTE. Communications for the attention of the Editors should be addressed EDITOR RAILROAD GAZETTE.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies, the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and in their management, particulars as to the business of railroads, and suggestions as to its improvement. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially, either for money or in consideration of advertising patronage.

THE MASTER MECHANICS' CONVENTION.

Elsewhere in these columns will be found a report of the proceedings of this meeting, which, as previously announced, was held this year in Chicago. In its general character it differed very little from previous meetings, excepting perhaps in the length of the reports. These, with one or two exceptions, were longer than ever heretofore. The result was that so much time and attention were consumed in reading and hearing them, that the discussions were more brief than the importance of the subjects to which they referred seemed to demand. As the length of the reports has been increasing each year, it is obvious that, unless this tendency is arrested, all the working hours of the Convention will be absorbed in listening to the reading of them. For this reason, either those who write them must condense what they have to say into less space and fewer words, or else the Convention must remain in session longer than three days. It was proposed to print the reports of the committees some weeks before the meeting of the Convention, and furnish each member with a printed copy of the report, so that it could be carefully read by each of them before coming to the Convention. This would make it possible to dispense with the reading before the Convention, and also enable members to understand and discuss them more intelligently than is possible from merely hearing them read. Much time could undoubtedly be saved in this way, and it would also enable members to give more careful consideration to the substance of the reports, and thus be better prepared for the discussion of them. The proposition was, however, not brought before the Association for its consideration, and therefore no action was taken. The plan seems to have much to recommend it and to be worth careful consideration.

At all meetings of this kind, there is always some one subject which attracts more attention than any other. This year the subject which was most discussed, and seemed to attract the greatest attention, was that of the Mechanical Laboratory. There was of course great diversity of opinion concerning the advisability of embarking in such a project. In fact, there did not seem to be any very definite idea in the minds of those present concerning the character and objects of such an adjunct to the Association. The proposition made by the Stevens Institute, although a very liberal one, at the same time contemplated so much more than the members generally did, that nearly all were disposed to hesitate before taking any definite action. The whole subject was therefore referred back to the committee, and further action deferred until next year. Although nothing definite was done, yet the discussion will have the effect of inducing members to

think on the subject and consider more carefully whether the scheme is practicable or not.

The purification of water and the incrustation of boilers were discussed apparently with more interest than any other subject, excepting perhaps the one referred to above. Doubtless the reason is that the evils resulting from the use of impure water are so great and are so often brought to the attention of master mechanics that they are at all times ready to listen to any discussion of the methods of mitigating the evil. Eastern members generally, and all who have never been compelled to use water containing so much foreign matter as is found in nearly all that which is obtained on the Western prairies, can hardly conceive of the trouble encountered on nearly all Western roads. As the representation of Western members was greater than ever before, they of course engaged in the discussion with great zeal. If the able committee who have this subject under consideration are able to devise any means of overcoming or lessening this evil, they will be doing what will pay railroad companies a hundred-fold for the time, trouble and expense of holding the meetings of the Master Mechanics' Association.

It was gratifying to see science lending its aid to accomplish this desirable end, and if the practical men who thus meet together every year will only state plainly the extent and as far as possible the nature of this evil, and if scientific men will listen to their statements patiently, and earnestly endeavor to throw some clear light on the principles involved, the solution of the problem is, we believe, not far distant. There seems good reason for believing that both the scientific and the practical men are co-operating, and their investigations in this field of research can hardly help producing very valuable results.

Neither the report nor the discussion on "Fuel for Locomotives" seemed to excite much interest. The committee reported only seven answers to their circular. It is doubtless difficult to get the necessary data which are required to present this subject properly. As none of the committee are chemists, of course they could not be expected to discuss it from that point of view, and an exhaustive series of experiments to determine by actual trials with locomotives the value of different kinds of fuel would require much time and care if they were made so as to be entirely conclusive. It may therefore be assumed that the subject, which is of great importance to railroad companies, is still an open one.

With the report on safety valves we have not sufficient acquaintance to form an intelligent opinion of its merits. Judging from the amount of discussion of the subject in foreign engineering journals, there is evidently room for a great deal to be said, and probably a lack of accurate knowledge concerning it. If the report does no more than to suppress the noise, which is a nuisance, of the "pop" valve, the committee will deserve the thanks of the community.

The report on "Boiler Explosions" was chiefly an account of the government experiments, which, as our readers know, were almost altogether fruitless of valuable results or information.

The Committee on "Valves and Valve Gearing" discussed chiefly the merits of different kinds of "balanced" valves.

"Locomotive Tires" were reported in the usual statistical way. This subject, it seems to us, is worn out. It would, we think, be quite as appropriate to discuss the quality of bar or pig iron made by different manufacturers as to investigate the wear and tear of tires. So long as steel tires were an experiment, it was quite proper that their mileage and breakage should be discussed, but they have passed the experimental stage and are now an article of merchandise quite as much as cast-iron car-wheels.

The report on "Standard Axles" had at least the merit of brevity. It was, however, discussed at some length and referred back to the committee. Doubtless the discussion will have the effect of educating some careful thought and observation of the working of axles of the size recommended by the committee, which is larger than that ordinarily used.

The reports on the other subjects we have not heard or read, and therefore are unable to form any idea of their value. The discussion of the report on "Continuous Train Brakes" became somewhat warm, and there was, when the motion to close the debate was made, considerable danger that the members would array themselves into two contending factions, the one the advocates of the atmospheric and the other of the vacuum brake. Such a result would be extremely unfortunate, as the merits of the two systems referred to should be demonstrated not by debate but by experiment and a record of results accomplished and expense of operation. It is impossible at the present time to determine with certainty which is the best and most effective system or form of continuous train brake, simply because they are all in a comparatively immature state of development. The requisite data are not at hand from which to form an opinion which would be conclusive. What is now most needed is facts, and from them each of us will have little difficulty in forming conclusions; but if the deliberations of the Association should be made the arena for the

expression of opinions which, at present, will inevitably be composed largely of personal prejudices, then the debates are certain to degenerate into mere personal wrangling. Give the Association facts only, the results of experiments, cost of operation, etc., and if they are misstated a correction will be easy and sure; but a wrong-headed opinion may squirm on forever, doing evil continually. The consideration of the subject is, in fact, surrounded with dangers. There are now large pecuniary interests involved in it. Long and expensive litigation of the various patents is almost certain in the future, and whichever system gains ground now will be very likely to hold it. Therefore a favorable report made to the Master Mechanics' Association is a thing very much desired, and very great influence is certain to be employed in order to secure such a report. No matter which system is recommended or reported on favorably, the way is opened for all kinds of charges and suspicions. For this reason, at the present stage of the discussion, it would, we think, be wise to confine reports and debate to the presentation of the simplest facts and statistics. It may not be amiss to state here that one of the members appointed to report on the brake question next year, it is said, is himself the inventor of a continuous brake. The appointment was, we believe, made inadvertently. It would be a graceful act if he should decline to serve, and allow some one who has no such interests to take his place.

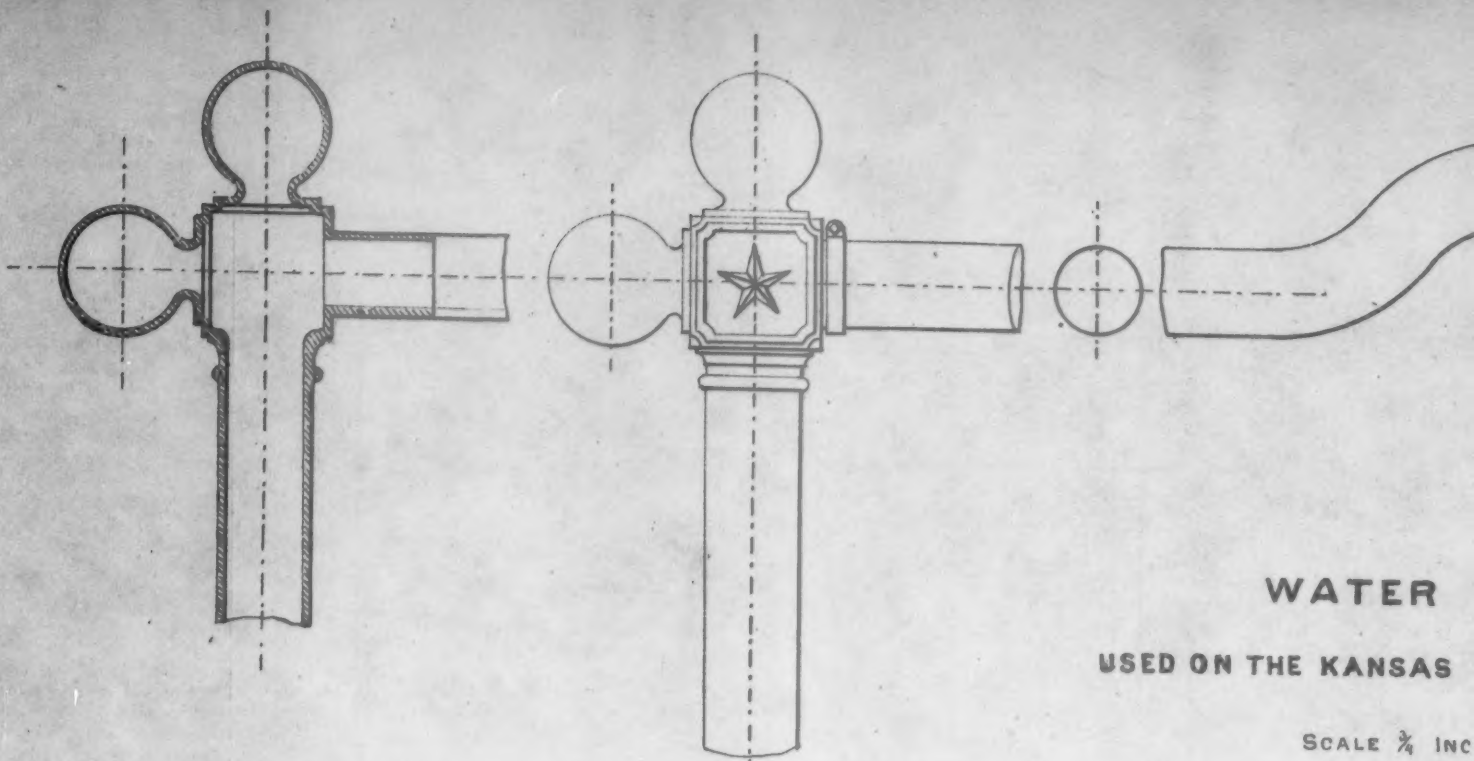
The report on "Machines for Supplying Water to Tanks" was illustrated with many drawings of water-tanks, etc., which, if engraved, will have great value.

The committee appointed to consider "Narrow and Broad-Gauge Rolling Stock," it seems, disagreed in opinion, and for this reason statistics which would have had much value were withheld from the Association. This, we hope, will not occur again next year, but that the members of the committee will give the Association the benefit of their opinion and knowledge, by giving two reports in which both views of the subject may be presented. The report was the last one called for, and came up late in the evening, when all were tired out and anxious for an adjournment. It was therefore passed over without the consideration which it deserved, and which, it is to be hoped it will receive next year.

Altogether, the session this year may be regarded as a very successful one. The attendance was quite as large as heretofore. Naturally the Western members predominated. Many new ones were admitted who, there is reason to believe, will attend annually hereafter. The evil which most needs alleviation in future meetings is the consumption of time by the reading of reports. The writers of these should remember that the average human mind has very limited capacities of giving attention, and for this reason all good writers aim to express their ideas in as few and as simple words as possible. If an idea is hid under an immense mass of verbiage, the attention is exhausted in extracting it; whereas, if it is more simply and clearly stated, part of the exertion required to discover the meaning can be given to the reception of new ideas. Now, in writing a report the aim should be to convey to those for whom it is intended the most important ideas in the clearest and simplest way. If this is done there will be some capacity of giving attention left for the subsequent discussion; but if the report wanders to and fro and around and over the subject, the hearer's attention becomes exhausted and the "subsequent proceedings interest him no more." A little calculation will show how very little time there is, comparatively, for hearing reports at the annual session of the Master Mechanics' Association. The meetings are held from 9 A. M. to 2 P. M. for three days, or fifteen hours altogether. There were, including the President's address and two papers and the communication from the Stevens Institute, twenty documents to be heard. An ordinary reader will deliver about 125 words per minute. If, therefore, the average length of the reports, papers, etc., should be equal to that of this article, which contains about 2,500 words, it would take over 6½ hours to read them, or nearly half of the available time of the Convention. Of course there is much time lost in calling the roll, recesses, explanations, etc., so that, counting in the extra sessions and considering that most of the reports were longer (some of them four or five times longer) than this, it is safe to assume that more than half the time of the Convention was consumed in hearing read what could be done at home much more comfortably and intelligently. If, therefore, the debates are to be improved in future, it is imperative that either the reports should be made shorter or be printed and read before the meeting of the Convention, and the reading there be dispensed with. The amount of work done, however, at this last meeting was much greater than is usual at such meetings, and we believe the master mechanics can challenge any similar organization to show an equal amount of work in the time at their disposal.

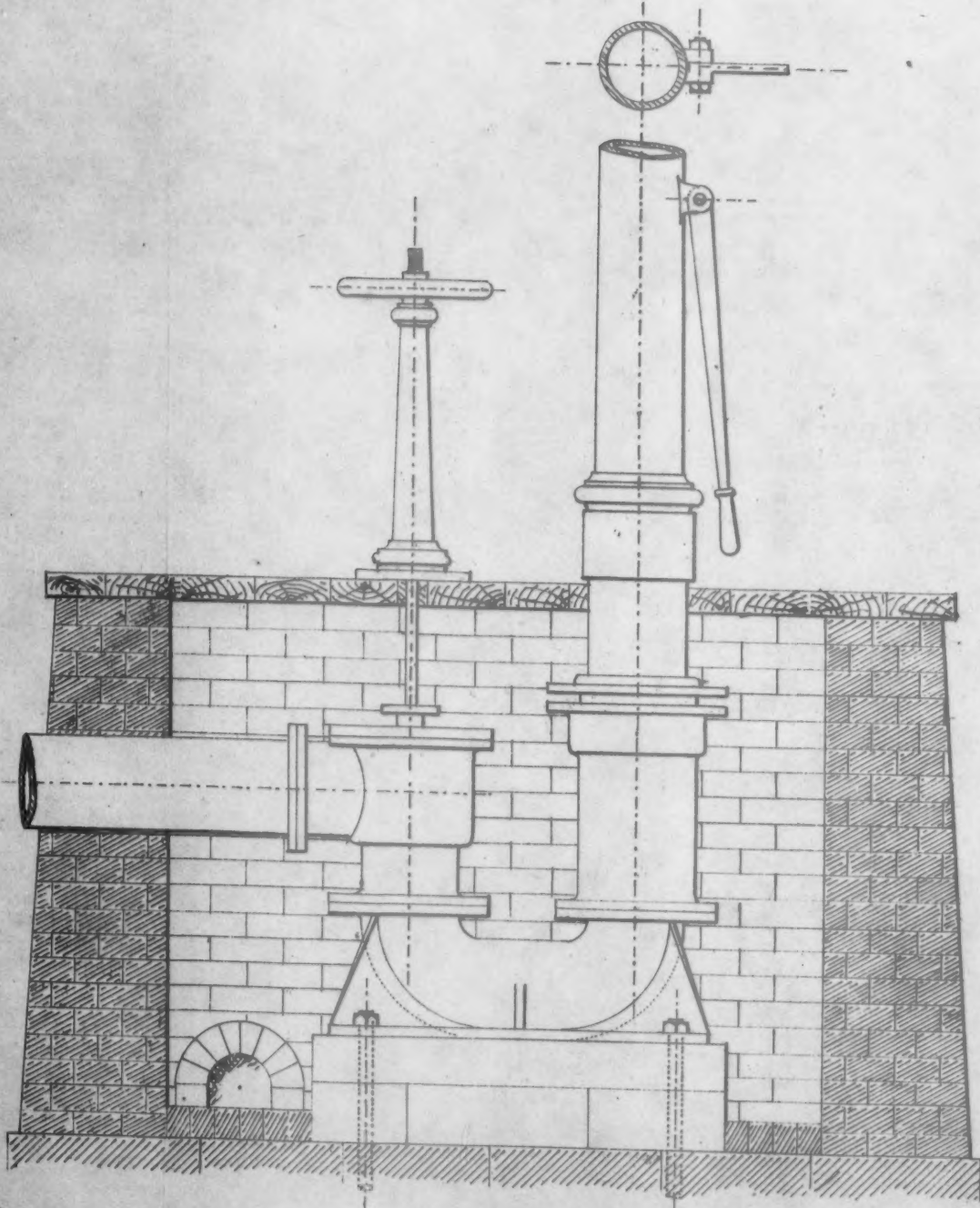
We heard the complaint made at Chicago and elsewhere that the deliberations of the Association are too inconclusive, that "they don't decide anything." Now, surely a moment's reflection will show the injustice of this complaint. For example, take the subject of incrustation. Here is an evil which has

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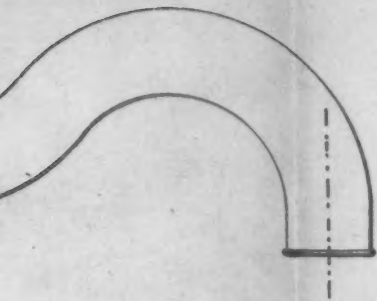


**WATER
USED ON THE KANSAS**

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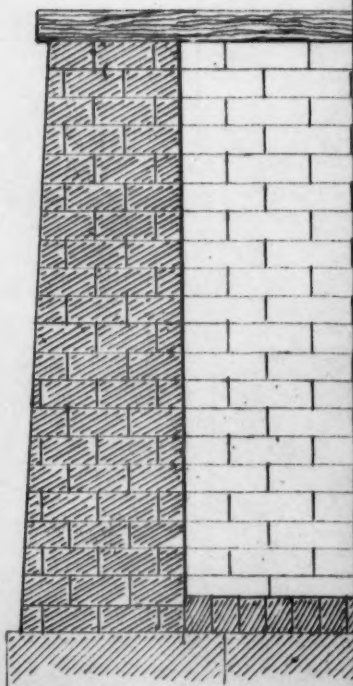
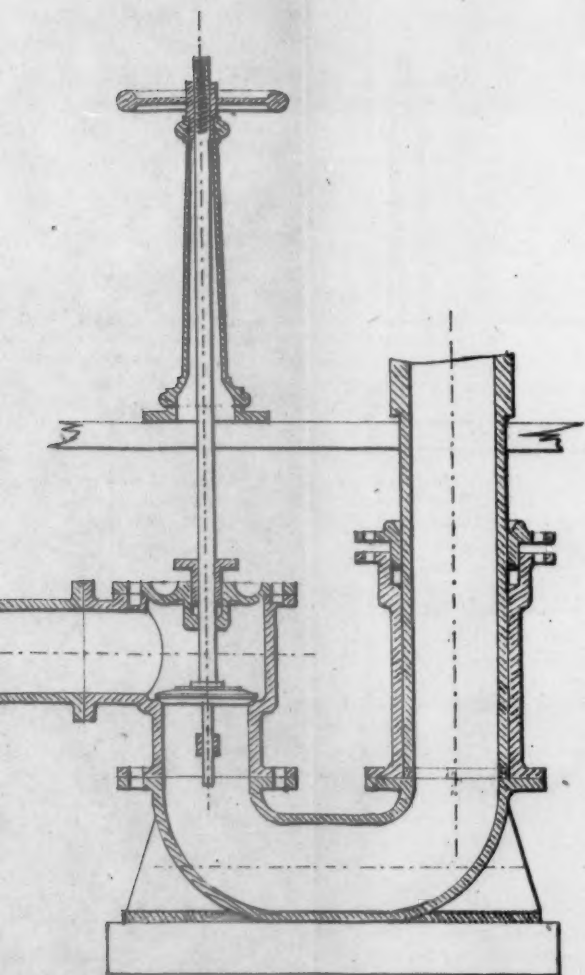


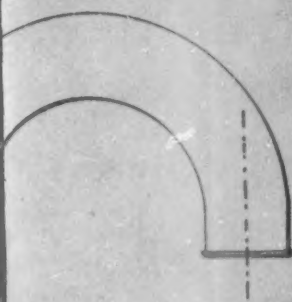
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TER CRANE
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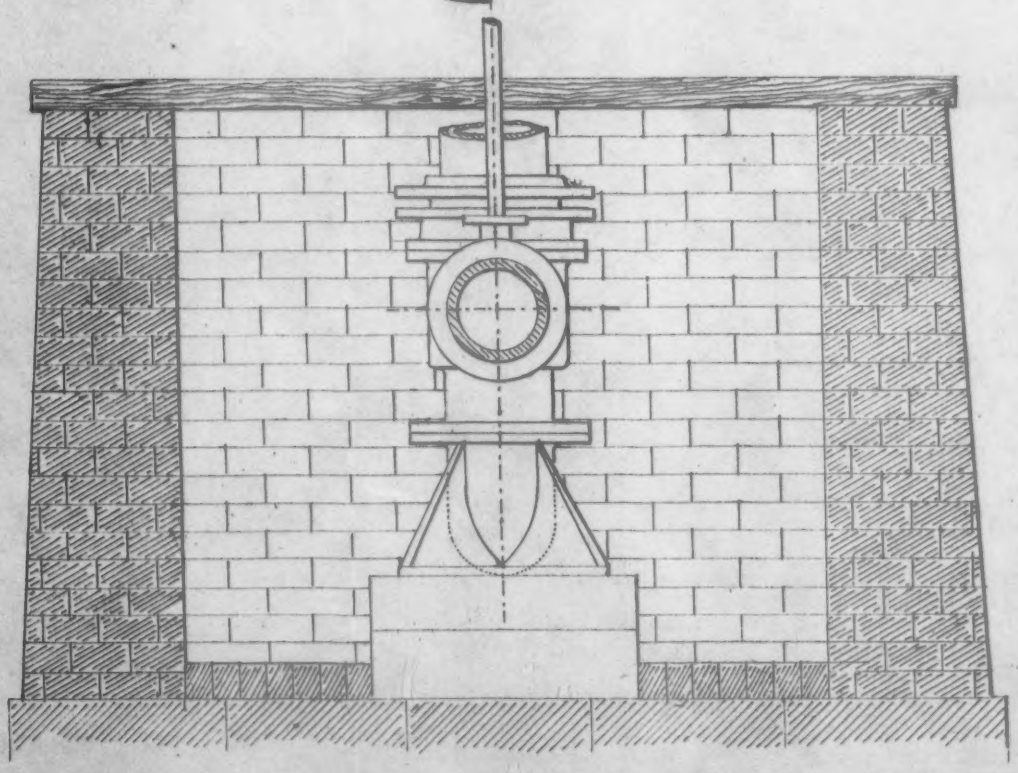
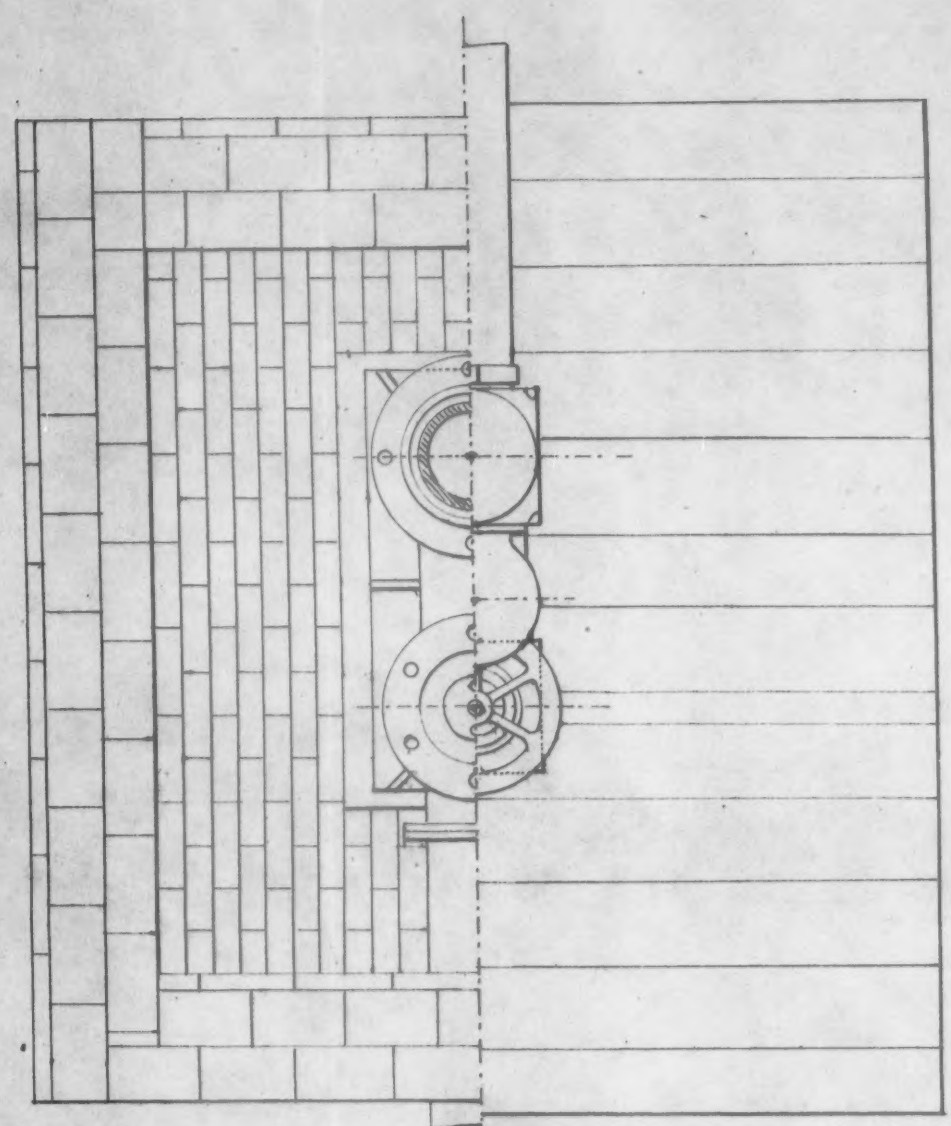
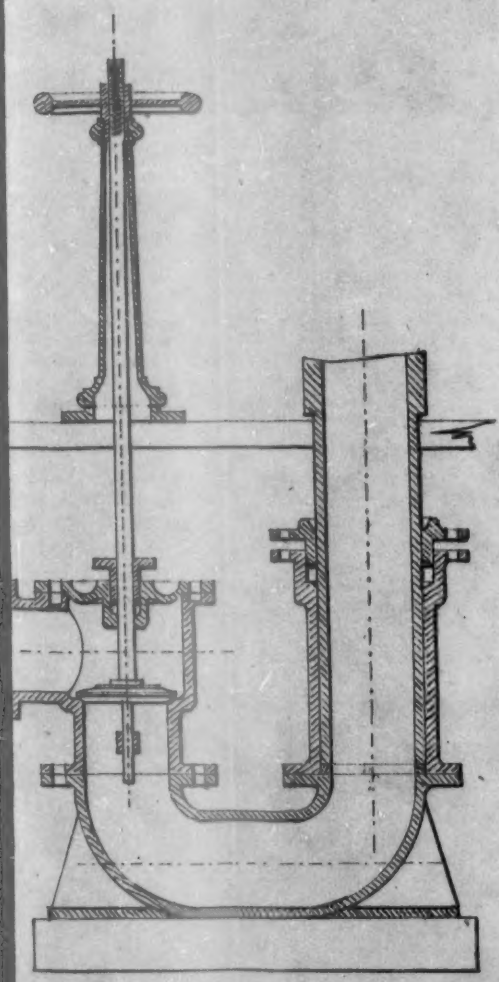
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existed a long time, but as with many other evils no efficient remedy has yet been found for it. The object and aim of the deliberation are and have been to find a remedy. Until such a remedy is found, any decisive action of the Association would be futile. It would be easy to pass a resolution asserting that saw-dust or pea-nuts should in future prevent the deposit of scale in locomotive boilers, but we fear such a resolution would have little effect on the scale, and make the remedy no more efficacious. The fact is, the subjects which are investigated are incapable of decision in the way proposed. In some of them, such as a standard for car axles, it is necessary to reconcile conflicting opinions and thus agree upon some common action, but until the reconciliation takes place among at least a majority, no decisive action is possible.

To those master mechanics who have thus far held aloof and are disposed to cavil at the proceedings of the Association, we say come next year and see for yourselves, and whatever in the proceedings needs reform, lend your voice and influence to effect the required change.

The Mexican Railroad Contract.

The Mexican Inter-oceanic & International Railroad Company, according to a telegram from Mexico, has had its concession declared void by Congress, presumably on account of failure to deposit the security required. This is the company of "fourteen merchants," who came in at the last hour and adopted the plan of the International Company and secured a contract from the Government in preference to that American association of New York capitalists and another of Philadelphia men. It took the contract at an unfortunate period, however, when scarcely any company, not to say one entirely inexperienced in railroad enterprises, could hope to succeed in obtaining the capital necessary for so extensive an enterprise. Moreover, this company depended wholly upon European capital, and made strenuous efforts both in England and Germany to secure it, but failed, and, it is said, received the assurance that there would be little chance of getting capital for any such enterprise there until the nation makes some movement towards paying its national debt, the interest on which has been unpaid for many years. The telegram does not relate the circumstances which brought the contract before Congress. Ordinarily, Congress would have nothing to do with it; but if the company failed to deposit the security of \$150,000 on the 17th of April as required by the contract, its charter would become void and would be so declared by the Executive. It is probable that the company applied for some modification of its contract, such as an extension of time, and that it was in considering this application that Congress found an opportunity to act.

Private letters from Mexico say that in response to the call for popular subscriptions to the stock, which we mentioned a few weeks ago, and which was scattered far and wide among all people who could by any possibility become stockholders, just three shares of \$100 each were subscribed, and thirty dollars paid in. With this capital as a basis, no wonder Congress distrusted its ability to construct a net-work of railroads.

The field is thus left open again—probably entirely open—and with the probability that an American company not only may be but must be depended upon to carry out the scheme. The times are not such now as to make it probable that there will be eager competition for the contract, and Mexico will probably have to wait a little before it can have the work begun; but the Americans who were given a provisional contract by the Executive last year under the name of the "International Company" will probably be ready again to enter into negotiations and be able, moreover, to carry out their project within a reasonable period.

Mexico cannot afford to relax its efforts to secure the construction of a system of railroads, without which, indeed, much further material progress of the country seems almost impossible, and with which and the maintenance of order (of which there is better prospect now, probably, than ever before), the nation may be able to make rapid progress in wealth, power and consideration.

Water Crane in use on the Kansas Pacific Railway.

The lithograph given herewith represents the crane in use for supplying water to locomotives on the Kansas Pacific Railway. It is a copy, reduced in size, of the drawing to which was awarded, at the annual meeting of the Master Mechanics' Association in 1873, the prize offered for the best drawing of machinery for supplying fuel and water to engines. The drawing was made by Mr. E. Moyel, draftsman in the Kansas Pacific shops at Wyandotte, Kan.

Record of New Railroad Construction.

This number of the RAILROAD GAZETTE has information of the laying of track on new railroads as follows:
Devils County.—Extended northward 4 miles to Lenhartsville, Pa. *Southern Pacific.*—The Los Angeles & San Bernardino line has been completed from Los Angeles westward 80 miles to Spadra, Cal.

This is a total of 34 miles of new railroad, making 423 miles completed in the United States in 1874.

APRIL EARNINGS are unsatisfactory again. The twenty-two companies whose reports are given in our table have, in the aggregate, with an increase of 3% per cent. in mileage, a decrease of 1% per cent. in gross earnings. The earnings per mile worked have fallen from \$612 to \$581, a decrease of 5 per cent. Two of the most important lines—indeed the two with the largest earnings—have disappeared from the table: the

RAILROAD EARNINGS, APRIL, 1874.

Name of Road.	Mileage.					Earnings.					Earnings per Mile.	
	1874.	1875.	Inc.	Dec.	Per c.	1874.	1875.	Increase.	Decrease.	Per c.	1874.	1875.
Atlantic & Great Western.....	571	539	32		6	\$ 424,104	\$ 434,845				\$ 743	\$ 80
Burlington, Cedar Rapids & Minnesota.	424	384	90		27	48,692	77,387	\$ 7,805		0%	310	23
Central Pacific.....	1,218	1,219				1,192,000	1,192,400	2,581		0%	929	92
Chicago & Northwestern.....	1,480	1,404	36		1%	1,074,026	1,024,026	49,705		4%	700	47
Chicago, Milwaukee & St. Paul.	1,236	1,236				724,051	724,258	167,793		29%	604	26
Chicago, Danville & Vincennes.....	157	139	25		19	48,628	39,132	6,496		16%	291	20
Cleveland, Columbus, Cin. & Ind.....	470	470				342,240	405,900		63,657	18%	738	86
Illinois Central.....	1,109	1,109				680,921	553,911	27,009		4%	524	49
Indianapolis, Bloomington & W'tn.....	344	319	25		7%	160,036	124,045	25,991		21	436	36
Kansas Pacific.....	761	672	89		15%	392,143	352,296		60,155	17%	594	52
Michigan Central.....	767	715	79		10%	653,802	676,841	7,961		1%	864	87
Missouri, Kansas & Texas.....	794	641	154		22%	514,000	348,771		44,871	17%	689	47
Mobile & Ohio.....	517	517				134,954	227,276		92,322	40%	261	44
Ohio & Mississippi.....	393	393				299,805	342,482		42,677	13%	763	87
St. Louis, Alton & Terre H., main line.	266	266				100,289	113,631		13,348	11%	377	41
" " " branches.	71	71				41,254	48,452		7,198	14%	681	66
St. Louis & Iron Mountain.....	301	289	21		7%	160,901	207,627		46,726	29%	519	77
St. Louis, Kansas City & Northern.....	607	583		70	13%	190,846	231,886		36,040	19%	386	36
St. Louis & Southeastern.....	348	348				99,907	109,358		9,991	9%	369	29
Toledo, Peoria & Warsaw.....	237	237				94,869	84,260	10,300		13%	399	33
Toledo, Wabash & Western.....	623	628				447,865	446,527	1,238		0%	713	77
West Wisconsin.....	197	197				79,117	70,975	8,143		13%	402	3
Totals.....	12,766	12,319	523	76		\$7,414,993	\$7,536,090	\$93,568		427,326	\$81	\$6
Total increase or decrease.....			447		3%					121,758	1%	

RAILROAD EARNINGS, FOUR MONTHS ENDING APRIL 30.

NAME OF ROAD.	Mileage.				Earnings.				Increase.	Dec.	Per c.	Earnings per mile.					
	1874.	1873.	Inc.	Dec.	Per c.	1874.	1873.	Inc.				Dec.	Per c.				
Atlantic & Great Western.....	671	539	32	6	\$1,578,717	\$1,590,668	.....	\$11,851	0%	\$2,765	\$2,951	.....	\$186	61	.....	61
Burlington, Cedar Rapids & Minn.	1,218	1,354	90	27	362,224	304,930	.....	\$57,294	18%	854	918	.....	89	60	.....	60
Central Pacific.....	1,430	1,404	26	1%	4,011,223	3,818,998	.....	492,25	12%	2,801	2,907	.....	106	13	.....	13
Chicago & Northwestern.....	1,38	1,150	80	7%	2,630,245	1,887,978	.....	742,269	39%	1,238	1,452	.....	486	29%	.....	29%
Chicago, Milwaukee & St. Paul ..	107	132	25	19	195,935	185,527	.....	10,408	5%	1,342	1,404	.....	164	18	.....	18
Chicago, La Salle & Vincennes.....	470	470	.....	.....	1,314,543	1,609,137	.....	294,594	18%	2,797	3,426	.....	427	18%	.....	18%
Cleveland, Col., Cin. & Indianap..	1,109	1,109	.....	.....	2,266,480	2,414,341	.....	147,861	6%	2,044	2,170	.....	136	6%	.....	6%
Illinois Central.....	344	310	28	7%	881,647	427,383	.....	454,264	36%	1,094	1,940	.....	846	26%	.....	26%
Indianapolis, Bloomington & W.....	761	672	89	13%	886,696	998,358	.....	111,663	11%	1,105	1,486	.....	321	21%	.....	21%
Kansas Pacific.....	737	715	72	10	2,490,225	2,353,764	.....	136,461	4%	1,164	1,534	.....	370	5%	.....	5%
Michigan Central.....	764	641	143	22%	958,980	940,622	.....	14,358	1%	1,218	1,467	.....	249	17	.....	17
Missouri, Kansas & Texas.....	517	517	.....	.....	817,197	1,055,879	.....	238,682	29%	1,218	2,462	.....	481	20%	.....	20%
Mobile & Ohio.....	393	317	893	.....	1,102,096	1,252,668	.....	150,572	13%	2,854	1,817	.....	389	12	.....	12
Ohio & Mississippi.....	266	266	.....	.....	387,708	483,723	.....	76,015	16%	1,458	1,781	.....	299	16%	.....	16%
St. Louis, Alt. & T. H. Main Line.	71	71	.....	.....	161,977	195,037	.....	33,060	17	2,281	2,747	.....	466	17	.....	17
..... Branches.....	310	289	21	7%	636,111	739,964	.....	93,853	12%	2,053	2,626	.....	474	18%	.....	18%
St. Louis & Iron Mountain.....	507	583	76	13	782,840	871,983	.....	119,143	13%	1,485	1,496	.....	11	0%	.....	0%
St. Louis, Kansas City & Northern	349	349	.....	.....	413,315	402,762	.....	10,553	2%	1,183	1,154	.....	29	2%	.....	2%
St. Louis & Southeastern.....	237	237	.....	.....	371,739	349,700	.....	22,039	6%	1,669	1,475	.....	94	6%	.....	6%
Toledo, Peoria & Warsaw.....	628	628	.....	.....	1,628,458	1,693,226	.....	64,770	3%	2,693	2,690	.....	103	3%	.....	3%
Toledo, Wabash & Western.....	197	197	.....	.....	313,571	238,596	.....	86,975	36%	1,693	1,190	.....	442	36%	.....	36%
West Wisconsin.....																	
Totals.....	12,760	12,233	609	76	27,525,952	27,163,716	\$1,714,340	1,352,104	\$2,156	\$2,221	\$6	27	27
Total increase.....			583	8			362,238		1%			

Lake Shore & Michigan Southern, which did not report its March earnings, and the Erie, which is missing for the first time. None of the main lines between the East and the West are represented therefore, except the Michigan Central. On the whole, the decrease in the cost of working ought to balance or more than balance the decrease in receipts, as very few of these roads have been largely affected by the exceptionally low through rates which prevailed part of that month.

For the four months ending with April there is, with an increase of 5 per cent. in mileage, an increase of $1\frac{1}{2}$ per cent. in gross earnings, and a decrease of $2\frac{1}{2}$ per cent. in gross earnings per mile—from \$2,221 to \$2,156. The length of road embraced in these reports is 12,766 miles—about 17 per cent. of the total mileage in the United States.

THE NORTHERN PACIFIC GUARANTEE BILL, a correspondent informs us, does not include a guarantee of the principal of these bonds, as we stated in commenting on it last week. Our remarks were based on a telegraphic report which was pretty full, and in its wording naturally led to the inference that the principal was guaranteed. The difference, of course, is an important one, and makes our statement of the obligations imposed upon the Government by the bill an exaggerated one.

THE CATECHISM OF THE LOCOMOTIVE, owing to the length of the report of the Master Mechanics' Convention, is omitted this week.

NEW PUBLICATIONS.

The Keystone Bridge Company's Illustrated Album.—The Keystone Bridge Company has recently issued a very handsome publication of 60 large pages of text and twelve full-page lithographic plates of the structures which it erects and the materials of which they are composed. Besides the lithographic plates, there are several handsome wood cuts printed with the text, including views of the company's old shops, its new works, the Union Iron Mills (from which this company obtains its shaped irons) and the Lucy Furnace, connected with these mills; also perspective views of the channel span of the Cincinnati & Newport Bridge, of the bridge to be erected over the Hudson at Poughkeepsie, the Keokuk Bridge over the Mississippi, the bridge over the Connecticut at Middletown, and the method of erecting the St. Louis Bridge. The lithographs give plans and elevations of solid, trussed and plate girders, single intersection deck and through bridges and double intersection through, with many details, pivot bridges, long spans, suspension bridges, street and park bridges, iron roof trusses, a wrought-iron turn-table, diagrams of strains under progressively increasing loads, an ornamental competitive design submitted for the Girard Avenue Bridge in Philadelphia, and a plate of sections of beams, channels, T's, angles, tubular columns, struts, etc., which are furnished by the company. The text contains a considerable amount of matter besides the descriptions of the structures illustrated, and withal a tabular statement of the iron and wooden bridges constructed by the company, by which it appears that the iron structures are equivalent in length to 64,900 feet of single track, and the wooden ones to 47,600 feet, altogether measuring 21 miles and more of bridge.

The Victoria Bridge—An Explanation by Mr. Charles Bender.

TO THE EDITOR OF THE RAILROAD GAZETTE:

Your paper of the 9th of May contains a letter from Mr. E. P. Hannafoord, of the Grand Trunk Railroad of Canada, in which the gentleman criticises my paper on the comparative merits of American and European bridges as far as the quotation of the report which relates to the losing of rivet-heads is concerned.

I have said in my paper that "*It has been reported, that the Victoria Bridge in Canada loses its rivet-heads, etc.,*" and believe myself to have been sufficiently entitled to quote this report, since it had been told to me twice by Mr. C. Shafer Smith, Chief Engineer of the Baltimore Bridge Company. By another source I had been told that during winter the rivet-heads had been seen lying on the ice, forming lines over the river. A third party, a bridge engineer in Boston, had told that he had picked up rivet-heads himself when visiting the structure.

These reports, agreeing with each other well and with experience gained by other parties and in other locations, and at the same time being more than plausible from a scientific point of view, I did not consider it necessary to first collect more information from the engineers of the road which uses this bridge.

Like Mr. W. W. Evans, who has since given the facts backing his assertions concerning the settling of spans of the Victoria Bridge, I have the sole desire of promoting *true* principles of construction, and I am not influenced to prefer one mode of construction to the other from any egoistic consideration whatever.

I, therefore, and probably many other engineers, would be pleased if Mr. Hannaford would take the pains, instead of denying in a general expression the truth of the reports quoted, to collect data and to give us a detailed and technical report of the behavior of the Victoria Bridge since its construction, and likewise to explain whether it is true, what also has been reported, namely, that since that time the bridge has been reinforced over the piers where continuity originally was projected.

Until these valuable data have been received, it will be impossible for me to prefer with certainty one of the two contradictory assertions, though I cannot deny that I am substantially still inclined rather more to the one quoted in my paper.

CH. BENDER, C. E.

The Organization of a Railroad Bureau.

Last fall the Railway Association of America appointed a committee to draw up a definite plan for a Railroad Bureau, which should have paid officers, collect and publish statistics and do the other work, involving in some cases considerable expense, which an association formed of and supported by railroad corporations might undertake. The report of this committee is as follows:

The committee appointed at a meeting held in Chicago, October 8, 1873, to draft a definite plan for a railway bureau, with rules for its government, beg to report that they have examined the subject, and are unable to propose any definite plan that they think would be likely, at this time, to meet the ac-

ceptance of the managers of roads. While the committee regard a bureau as the most desirable form of an association, there does not seem to be such interest on the part of managers, in the information and statistics to be gathered by such means, as to warrant the expectation that the effort to establish a bureau would be successful, and especially as the expense attending a properly organized bureau would be considerable. The committee are of the opinion that much good would come from the formation of local clubs or societies, where meetings could be attended conveniently, and without the use of much travelling. Such clubs would serve to foster the spirit of study and research, and afford opportunities for members to discuss matters of professional interest, and might take the place of the present national association until such time as the sentiment of managers gave promise that a national bureau could be efficiently organized and sustained.

ROBERT HARRIS,
CHARLES FAINE,
A. A. TALMAGE.

THE MASTER MECHANICS' ASSOCIATION.

(Continued from Page 193.)

ence. He believed the induction part might be made smaller. He had also tried a valve gotten up by a man in California, which he described. This he had on ten engines, and although there is some trouble in adjusting, as a general thing it works well, allowing the engine to run with the reverse lever between two notches, and allowing the same to be moved while running, with one hand. The difficulty with this was in the moving of the cylinder. He did not want the Convention to understand that this balance valve could be used without some cost in putting on and running. Yet he thought they were successful. The Adams, the Elliot, and the Collier valve, all have worked well on his road.

Mr. Hayes, of the Illinois Central, asked the results in the consumption of fuel, from the use of balance as compared with the old valves.

Mr. Jackman had come to the conclusion that the advantage in fuel was not more than 3 per cent. The saving, if saving there is, is in the wearing of the valve-gear. He thought a good deal had been saved on valve-gears.

Mr. White, of the Evansville & Crawfordsville, had more than twenty-five years ago got up a valve similar to one described by Mr. Jackman. He had then learned that a man in Massachusetts had a similar thing. He thought if it had been a good thing, and invented so long ago, it would have been in general use.

Mr. Jackman had run an engine on the Boston & Worcester road many years ago, and it was the very one which had the valve Mr. White spoke of. It was different from the one he mentioned in many respects, which he pointed out. It was used for some two years and taken off. That had simply one cylinder with a piston working in it. The one he now used had a cylinder in a cylinder, a piston in the inner one.

Mr. Hudson, apprehended, with regard to the lifting of the valve, that it would depend a good deal on whether the engine was reversed or not.

Mr. Chapman, of the Cleveland & Pittsburgh, had recently used the Cummings valve with good results.

Mr. Jackman explained his manner of testing the valves, by placing them in engine and giving them to his best runners, without telling them of it. If they discovered any change he took advantage of it.

Mr. Elliot, of the Ohio & Mississippi, was pleased to hear the statement with regard to the Cummings valve, as it was simply a modification of the valve he was using. It showed a contraction of the part could be made, and allow the engine to do just as good work.

Mr. Hudson, some time about 1851, was in charge of the motive power of the Buffalo & Rochester road. Then they had a valve in use calculated to diminish the pressure and maintain the size of port. They did not work, and he put in a new valve, covering one-half the size of the port. They worked well.

Mr. Jeffrey, of the Illinois Central, remembered experiments made 12 years ago, on the Central, showing that as the area of openings increased, the pressure on the blocks would increase. The general conclusion was that the pressure on the valve depended more on the opening under the valve than on the valve itself. A square box valve, without either top or bottom, coming within one-sixteenth of the steam-chest cover, with a ring held up by spiral springs, was in use during 20 months, some seven years ago. It would allow the reverse lever to be placed anywhere. But most of the time there was a slight blow, and perhaps this accounted for the engines not showing any better mileage for the coal. After that they took a Rogers' valve, and put a plate on it. On the under side of the chest they placed a groove, putting a ring between that and the plate. This was not satisfactory. Then a valve was made almost the height of the steam chest, the top of which and the under side of the steam chest were planed off. In heavy pressure this worked well, but not in light. Later, a pair of valves had been placed in use similar to the ones described by Mr. Jackman. They were not satisfactory, and were taken off. They have also in use a pair of Mr. Elliot's valves, and the use so far is rather satisfactory. The seats wear slightly convex, but the valve has been cut off a little, which may obviate it.

Mr. Woodruff, of the Central of Iowa, thought an important point was the travel of the valve.

Mr. Hudson wished to correct the statement of Mr. Jeffrey. The valve he alluded to as the Rogers valve should be called the Hackworth valve.

Mr. Robinson thought this discussion showed amply the need of a mechanical laboratory, by which all these experiments could be made, and their expense saved to the different roads.

Mr. Hudson said that when we talk about outside and inside lap we always ought to say how much travel the valve had. Different results were had by changing the travel.

Mr. Jackman had no engines with less than four and a half travel, built none with less than five, and the limit was five and a half. The larger portion was five and a quarter.

Mr. Chapman, as the time was limited, moved the discussion close, and the motion prevailed.

TIRES.

The Committee on Tires presented its report, read by the Secretary.

The Committee say:

The superiority of steel tires having been already demonstrated, all that remains to be determined is, which is the best tire, and how thin steel tires can be worn with safety. As it will take time for the steel tires now in use to wear out, we are not likely to obtain the desired information in regard to either of those points for some time to come.

The whole number of sets reported on is 359.

Upon the subject of setting and fastening steel tires, of the 15 companies reported, 10 use shrinkage alone, 2 use shrinkage and set-screws, and 3 use set-screws alone.

The amount of shrinkage allowed is:

Five allow 1-100 inch to 1 foot in diameter of wheel.

One allows 1-32 inch to a 5-foot wheel, and less in proportion.

One allows 1-80 inch to 1 foot in diameter of the wheel if soft, and less if it is hard.

One allows 1-20 inch to a 5-foot wheel.

One allows 1-16 inch to a 5, and a 4½-foot wheel he secures by a screw.

One allows 82-1,000 inch to a 5 and 5½-foot wheel.

One uses set-screws 1½ inch in diameter, and allows shrinkage 1-16 inch to a 5½-foot wheel, and the same proportion to a 4½-foot wheel.

One uses set-screws and allows 1-32 inch shrinkage to a 4½-foot wheel.

One uses lap bolt through felloe of wheel, counter-sunk ¾ of an inch in the tire.

The Great Western of Canada uses set-screws with thread of screw run ¼ of an inch into the tire, but has no thread cut in that part of the screw which passes through the rim of the wheel.

The reports indicate that chilled tires will average about three years in durability.

The lowest thickness of tires at removal was 1 3-16 inches—the average about 1½.

Steel driving-axes and truck wheels were generally preferred. The Great Western of Canada prefers axles of good hammered iron.

DISCUSSION.

Mr. Wells gave some statistics, showing the comparative wear of tires.

Mr. Jackman remarked that the steel tire would last five years, while iron would last but two. He had found he could not afford to run without steel tires.

Mr. Towne inquired how thick the tire was, to wear out in five years.

Mr. Jackman replied 2¼ to 2½ inches.

Mr. Towne had instance of tires wearing much longer.

Mr. Jackman knew not the particular cause, but he did know his tires wore out in that time. He would not run a tire down to less than an inch and a half.

Mr. Hayes, of the Illinois Central, had worn out many tires, and had not taken them off, particularly in the Summer, till they had run down to 1½ inches. He thought this safe in the Summer. He thought the average was 165,000 miles run for a tire—about 10,000 miles to the sixteenth of an inch.

Mr. Miles asked of Mr. Wells how much a tire would wear without turning.

Mr. Wells thought there was nothing definite about it. Engines running on level roads would not make so good mileage for the tires as those on a harder grade, because they were loaded down more. There is a little imperceptible slip always going on, on a level road. His passenger engines ran much longer than the freight. One passenger engine had made 13,542 miles to the sixteenth of an inch, while a freight, with about the same weight, only ran 8,822 miles with a sixteenth of an inch wear.

Mr. Lauder, of the Northern of New Hampshire, would like to urge on the members of the Convention to give the Committee on Tires more material to use in making a report for next year. He found the most detailed reports showed the least wear, and took it for granted these were more accurate than the general remarks.

Mr. Woodruff asked what was the usual method of setting tires.

Mr. Jackman gave his tires one-sixteenth of an inch shrinkage, then heated them so they would just go on. A man took a wet rag and dampened the rim of the wheel, putting no water on the tire. For a 56-inch wheel he gave the twentieth of an inch for shrinkage.

Mr. Wells, for a five-foot wheel, allowed from one-eighth to one-twentieth of an inch. He never had any difficulty in cooling tire with water.

Mr. Miles had no doubt one great difference in the experience of wear of tires was the condition of the tracks—something with which master mechanics had nothing to do.

Mr. Sedgley, of the Lake Shore, said all knew that a thin tire, so long as it was safe, was more valuable, because of less weight.

Mr. Miles asked if the advantage of a thin tire would counterbalance that of a thick tire in diameter.

Mr. Jackman had an idea there was little difference on that score.

Mr. Lauder thought comparative tests were needed as to the wear of tires. To Mr. Miles he would say the first wear of a tire was always the best.

Mr. Hayes said Mr. Lauder reminded him of his specifications in ordering tires. They specified that they must be uniform outside, and got a better wear by not turning them before used.

Mr. Wells said that all the tires reported in his statistics had been turned.

Mr. Farris wanted to know if, in the averages, an account was taken of engines which were backing half the time, as in construction trains, where tire had to be turned down to favor the flange.

Mr. Lauder was of the opinion that the oftener a steel tire is turned, provided it is only skimmed to an even surface, the more mileage is got out of it.

RECESS.

The hour of 12 having arrived, a recess of ten minutes was taken.

AXLES.

The Committee on "Standard Axles" presented their report.

The Committee recommend the following proportions for freight and passenger car and tender axles:

Total length over all, 6 feet 11½ inches; journal, 3½ inches in diameter, by 7 inches long; wheel seat 4½ inches in diameter by 8 inches long, diameter in center, 4 inches; collar, 4½ inches in diameter by ¾ of an inch thick.

The Committee are of the opinion that owing to the great diversity in the construction of locomotive engines, no standard for the form and proportions could be adopted in the construction of the axles, without first making important modifications in the design and dimensions of other parts of locomotives. Such modifications the Committee do not believe were included in the subjects they were appointed to consider. They therefore recommend that the Committee be discharged from further consideration of the subject.

Report accepted.

Mr. Wells felt that the committee should have given some reason for making recommendations in the size of axles.

Mr. Forney, speaking for the committee, said that they had conferred with the master car builders at their convention in Boston, and had accepted their conclusions.

Mr. Fellows said he had had some experience with the axle provided by the car-builders, and had found it to be much more favorable for general use than the small journals, which in use cause considerable friction, and consequently "hot" boxes.

Mr. Jackman spoke of the advantages to be derived from a uniform size of axles.

Mr. Forney further stated that he had heard the opinion of many prominent railroad men, and that all who had used the standard axle were uniformly in favor of the large journal.

Mr. Wells objected to the large axle only on account of its weight.

Mr. Eddy stated that the Boston & Albany road had put the large axles into general use, and have found that the cars run much easier than with the small ones. He wished the Convention to look into the matter closely before taking action.

Mr. Lilly had found that there was a great deal less friction by the use of the large axle than the small one, but it had caused a greater amount of deflection.

Mr. Peddle could not understand how less friction could ensue when the size of the axle was increased.

Mr. Towne referred the gentleman to Mr. Sellers.

Mr. Peddle thought there was a limit in the size of axles, and he felt they had reached it.

Mr. Fellows was at first loth to make use of the large axle, but his road finally put them into use, and the one fact in their favor was the smaller amount of oil used.

Mr. Towne had put a large axle in an engine on his road five years since, and the result has been very satisfactory. He was decidedly in favor of them.

Mr. Cummings desired to know how much weight he carried on the trucks, in which the journals were used.

Mr. Towne replied from 9 to 11 tons.

Mr. Cummings thought unless there was a uniform weight in engines and cars there could be no uniformity in size of journal.

Mr. Peddle remarked that if the remarks of some of the gentlemen were correct, they should have to destroy their text-books.

Mr. Jackman said there was one feature concerning the use of the large wheel and axle—there was occasioned a greater weight, and the wheel necessarily pounded the track in running over it. Still he was in favor of the large axle.

Mr. Hudson found that the subject of the proper proportion of the size of the journal with regard to the weight to be carried was the principal point to be considered.

Mr. Forney thought that the simple fact of the increase of the weight of journal was an evil, but combined with a necessity for strength it was a necessity which could not be overlooked.

Mr. Wells thought that the size prescribed by the master car-builders was larger than was actually needed.

Mr. Forney said that a small axle might cover the present necessity, but it would not insure safety.

He thought some official action should be taken by the Convention concerning the axles, as to whether they should adopt the large size of axle.

Mr. Jeffrey felt that some statistics should be prepared concerning the wear and cost which the increased size would cause, and thus definitely ascertain the proper journal pressure per square inch.

Mr. Coleman Sellers stated that scientific experts had estimated the pressure an axle would sustain per square inch, and any further insight would be unnecessary.

Mr. Towne stated that they had no evidence concerning the practicability of the large journal, and he was not in favor of recognizing it as the choice of the Convention, as a body, until it had been properly experimented with.

Mr. Lilly thought the reason Mr. Peddle's journals did not heat the crank-pin was that they were so firmly held. An excess of friction can be overcome by lubricants. He agreed with Mr. Towne and thought a greatly increased journal was not needed.

Mr. Johann was not prepared to vote on a certain sized journal at this session. He had corresponded with railroad authorities to ascertain their opinion concerning a correct size of journal, and had found that they all differed upon the subject. He thought that the subject had received sufficient attention, and he accordingly moved that the discussion be brought to an immediate close.

The whole matter was, on motion of Mr. Fellows, referred back to the Committee to report at the next session.

COMMITTEE ON NEXT MEETING.

A committee was appointed to select a place and time for next meeting, as follows: Messrs. Wells, of the Jeffersonville, Madison & Indianapolis; Garfield, of the Hartford, Providence & Fishkill, and Robinson, of the Great Western.

OILS.

The committee appointed to report on "Oils for Locomotive Use" came to the following conclusions from communications received: The majority recommend the use of No. 1 extra lard oil, while others insist that it causes rust and declare that sperm oil is the proper thing. The use of mineral oil is condemned, but plumbago faintly recommended. As to water used, it was thought more lubrication was needed where hard water was the supply.

The committee close the report with the following recommendations:

The use of extra No. 1 or the best grade of lard oil as a lubricant for cylinders.

The use of hard water, they opine, has no injurious effect on the value of lard or tallow oil as a lubricant, other than the fact that with the use of hard water a greater quantity of oil is required.

The theory that an injurious chemical combination is formed that destroys the iron, the Committee believe to have sufficient merit to demand a careful investigation.

For general use on locomotive machinery the Committee recommend the use of No. 1 lard oil.

The best method of oiling valves is to have pipes running to the cab, and supplied with suitable cocks to blow through with steam. This relieves the fireman from any danger in oiling, and is reliable.

For journal bearings of cars the Committee recommend the use of, for freight, pure Virginia oil, of not less than 28 deg. gravity, and for passenger cars No. 2 lard oil.

The hour of 2 o'clock having arrived, on motion the convention adjourned till 8 o'clock.

THURSDAY'S EVENING SESSION.

The convention reassembled at eight o'clock, in the ladies' ordinary, Sherman House, anxious to close the business of the session.

CONTINUOUS TRAIN BRAKES.

Mr. Wells, Chairman of the Committee on Continuous Train Brakes, read a report of great length. Replies to their circular had been received from 20 roads. Of these, three only use hand brake, 14 the Westinghouse air brake. The theoretic requirements of a perfect continuous train brake were declared to be as follows:

1. Certainty of instant application to all or as many of the wheels of the train as practicable.

2. The retarding power should be capable of being graduated at the will of the person applying it, under all ordinary circumstances.

3. When applied, from any cause, it should so remain until the train is brought to a stop, unless persons in charge of it desire otherwise, in which case it should be capable of instant partial or total release.

4. The brake power should be under the control of the engineer of the train; it should apply itself automatically in case of derailment of any part of the train, or in case the train should part accidentally, and should be capable of application from any car in the train at the will of the persons thereon, when necessary.

The balance of the report was a detailed description of the Westinghouse air brake, which was represented as being the only thing that would answer the requirements.

A driving-wheel brake was recommended.

The opinion was that trains cannot be safely run by the use of hand brakes. Automatic brakes were not recommended.

DISCUSSION.

Mr. Peddle did not desire to criticize the report of the Committee, but it appeared that they had not criticised the Westinghouse brake in the least, but had placed all the odium upon the Smith brake. He thought the Westinghouse was open to criticism, as well as the others. The Westinghouse was expensive, which was certainly not the case with the Smith brake.

Mr. Eddy stated that on the Boston & Maine road the above

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two brakes were tested, and in experimenting with them it was found that the Smith vacuum brake brought a train to a full stop with greater ease to the train than the Westinghouse. On his own road, the Boston & Albany, they had used the Smith and Westinghouse, and without speaking derogatory of the latter, it had not done as good service as the Smith, having failed in several instances, which had never occurred in the case of the Smith.

Mr. Robinson—What occasioned the failure of the Westinghouse?

Mr. Eddy—The pump failed. Mr. Jackman had no confidence in any steam brakes, but believed in the automatic. He also desired to know how much steam was consumed for each appliance of the Smith brake.

Mr. Hayes had witnessed the appliance of the brake when experimented with in Boston, and knew that there was no perceptible loss of steam in applying it.

Mr. Hodgman stated that the Westinghouse had cost his road \$15 a month for repairs, while the Smith vacuum brake had incurred none. The Westinghouse also caused a continual loss of steam, also their engineers claimed that they could make a great deal better time with the vacuum than with the Westinghouse.

Mr. Eddy in reply to an inquiry stated that the Smith brake operated as well upon a large as a small train.

Mr. Lander, one of the Committee, had used both brakes and was pleased with both.

Mr. Jeffrey had found upon the Illinois Central road that the estimated expenses of repairing the Westinghouse brake on each engine ranged from \$5 to \$7 a month the year round.

A motion was made and carried that the discussion close.

RESOLUTIONS.

A resolution of thanks, accompanied by a donation of \$500, was made to the Secretary, Mr. Setchel, for past efficient service.

The thanks of the Association were tendered to Messrs. Prosser & Son for the donation of a dynamometer. Also to the Rogers Locomotive Works, and Mr. Evans, for donations.

J. H. Setchel offered the following, which was adopted: Whereas, An all-wise Providence has removed from our midst by death our friend and brother member, J. B. Gayle; therefore, be it

Resolved, That we tender to the bereaved family our heartfelt sympathy, and mourn with them the loss we deeply feel but cannot repair.

Resolved, That the Secretary be instructed to transmit a copy of these resolutions to Mrs. Gayle, and also publish the same in our annual report.

NEXT MEETING.

The Committee on Place of Meeting reported several suitable cities, recommending New York, Cincinnati and Montreal. St. Louis was added to the list. New York, by a unanimous vote, was selected as the place.

WATER.

The Committee on Machinery for Supplying Water to Tanks reported. The Committee recommended the use of a natural fall to get water into the tank where practicable; windmill, where the formation of the country will admit. Next, steam power. They ask, however, that the matter be referred back for further consideration.

On motion of Mr. Elliott, the report was laid over till next year.

FUNDS.

The Finance Committee reported the collection of \$1,155 assessment for the coming year.

NARROW GAUGE.

The Committee on Narrow and Broad Gauge Rolling Stock presented a report. The facts in the report were in tabular form. Report accepted.

Mr. Hudson explained that the weight of the cars was less on the narrow than on the standard gauge, but there were some exceptions. There was nothing to show in favor of the narrow gauge, but much against it.

Mr. Forney moved that the subject be continued one year, and referred to the same committee.

The motion prevailed.

OFFICERS.

On motion of Mr. Jeffrey, of the Illinois Central, the election was postponed for one year, allowing the present officers to hold another term. They are as follows:

President—H. M. Britton, of Cincinnati.

First Vice-President—N. E. Chapman, of Cleveland.

Second Vice-President—W. A. Robinson, of Hamilton, Canada.

Treasurer—S. J. Hayes, of Chicago.

Secretary—J. H. Setchel, of Cincinnati.

Resolutions of thanks were tendered to the Chicago committee, the proprietors of the Sherman House and to the Chicago press.

On motion of Mr. Sprague, the Convention adjourned to meet in New York on the second Tuesday of May next.

EXCURSIONS.

The members made good use of their time during their visit, and combined business and pleasure in liberal quantities. On Thursday afternoon they made a tour of the city in carriages, which were furnished through the liberality of their Chicago friends, who undertook the duty of entertaining them. The cavalcade consisted of 60 carriages in line, headed by the elegant Sherman house dog-cart, drawn by four bounding bays, combining to make an imposing pageant.

The route lay through Lincoln Park, back by way of the Water Works, which were thoroughly inspected, over Rush street bridge, and down Michigan and Prairie avenues to the south boulevards.

The day was uncomfortable, being dusty, and the lake breezes took cold comfort in thoroughly chilling the party, but, notwithstanding, a fair view was given of Chicago, and the tourists expressed themselves as thoroughly pleased with the trip.

Friday morning a large number of the members made a trip to Elgin in a train furnished by the Chicago & Northwestern Company, and there inspected the famous watch factory. Returning, a collection was taken up in behalf of the trainmen, which realized about sixty dollars for them, and doubtless caused the Master Mechanics' Association to leave a good impression on their minds. All these entertainments were provided by the subscriptions of 44 Chicago firms, chiefly those engaged in the manufacture or sale of railroad supplies, under the direction of an Executive Committee consisting of R. T. Cane, of Crane Bros. Manufacturing Company; A. L. Butler, of Vase, Dinmore & Co.; E. S. Shepherd, of Crerar, Adams & Co.; Charles L. Rice, of C. L. Rice & Co.; and J. S. Brewer, of the Union Car Spring Company. These entertainments, as mentioned above, consisted of a visit to the theatre Tuesday evening, an excursion on the lake Wednesday afternoon, music and dancing at the Sherman House Wednesday evening, carriage ride about the city Thursday afternoon, and the excursion to Elgin Friday.

A complimentary dinner was given to Mr. C. J. Brydges, late Managing Director of the Grand Trunk Railway, at Toronto, Ont., May 14, by the officers of several Canadian railroads. Mr. Brydges made a speech, in which he spoke of the improvements made in the Grand Trunk under his administration, and predicted a prosperous future for the road.

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ELECTIONS AND APPOINTMENTS.

—At the annual meeting of the Louisiana & Missouri River Railroad Company in Louisiana, Mo., May 4, the following directors were elected: Henry V. P. Block, T. J. C. Flagg, Louisiana, Mo.; Thomas Shackelford, Glasgow, Mo.; John W. Harris, Rocheport, Mo.; William King, Fulton, Mo.; J. J. Mitchell, R. P. Tansey, St. Louis; John Straut, Peoria, Ill.; John Crerar, Chicago. The board elected H. V. P. Block, President; Thomas Shackelford, Vice-President; P. Draper, Secretary, Treasurer and Auditor; T. J. C. Flagg, Attorney; J. J. Mitchell, R. P. Tansey, J. Straut, Executive Committee. The road is leased to the Chicago & Alton, and is part of its Kansas City line.

—At the annual meeting of the Indianapolis & Vincennes Railroad Company in Indianapolis, Ind., May 14, the following directors were chosen: D. S. Gray, Columbus, O.; J. N. McCullough, William Thaw, T. D. Messier, Pittsburgh, Pa.; Thomas A. Scott, Geo. B. Roberts, H. H. Houston, Philadelphia. The board re-elected Thomas A. Scott, President, and William Thaw, Vice-President.

—The new board of directors of the Houston & Texas Central Railroad Company met in Houston, Tex., May 11, and re-elected the old officers as follows: Hon. Wm. E. Dodge, of New York, President; Hon. Wm. B. Baker, of Houston, Vice-President; Wm. M. Rice, of New York, Financial Agent; C. Ennis, Comptroller; A. Groesbeck, Land Surveyor; F. A. Rice, Treasurer; A. S. Richardson, Secretary.

—At the annual meeting of the New Haven & Derby Railroad Company in New Haven, Conn., May 12, the following directors were elected: Morris Tyler, George W. Shelton, Henry Dawson, H. P. Frost, T. L. Cornell, Thomas Wallace, Jr., N. D. Sperry, J. H. Bartholomew, Charles Atwater, Isaac Anderson, Franklin Farrell, C. L. English, N. T. Bushnell, Edwin Marble.

—Mr. J. C. Belden has been appointed Superintendent of the Syracuse Northern Railroad in place of C. B. Morse, resigned.

—At the annual meeting of the Detroit & Bay City Railroad Company in Detroit, Mich., May 14, the following directors were elected: C. K. Carpenter, Orion, Mich.; T. North, Vassar, Mich.; L. Woodward, Rochester, Mich.; C. O. Fitzhugh, Bay City, Mich.; James F. Joy, Detroit; Isaac Livermore, Nathaniel Thayer, H. H. Hunnewell, W. F. Weld, Walter Hunnewell, Joseph Isagii, Boston.

—At the annual meeting of the Cheshire Railroad Company in Keene, N. H., May 13, the following directors were elected: E. Murdock, Jr., Thomas M. Edwards, William A. Brigham, John Henry Elliott, Samuel Gould, Isaac M. Murdock, George F. Williams.

—At the annual meeting of the Windsor & Forest Line Railroad Company in Greenfield, N. H., May 13, the following directors were chosen: Theo. H. Wood, Josiah G. Graves, Virgil C. Gilman, Nashua, N. H.; Hosea W. Parker, Roger W. Love, Claremont, N. H.; George E. Dame, Newport, N. H.; Christopher Robb, Stoddard, N. H.; Mark M. Spaulding, Hancock, N. H.; James Burnap, Marlow, N. H.; J. H. Dickey, Acworth, N. H.; Hiram Parker, Lempster, N. H.; Theodore H. Wood was chosen President, and Otis F. B. Waite, of Claremont, N. H., Clerk.

—At the annual meeting of the Kent County Railroad Company in Chester town, Md., May 11, the following directors were chosen: Isaac Parsons, Col. Richard C. Johnson, R. Nicholson, A. J. Rees, J. L. Stam, Wm. E. Cary, M. W. Serat, Thos. P. Dixon. M. W. Serat was chosen President. The election is a success of the Jay Gould or New York party over the local stockholders.

—The following officers of the Niagara River & New York Air Line Railroad Company were recently chosen for the ensuing year: President, J. W. Helmer; Vice-President, D. S. Morgan; Secretary, M. W. Evans; Treasurer, E. Kirke Hart.

—The Junction Railroad Company was organized in Boston, May 14, by the election of the following directors: Edward Atkinson, J. Preston, A. W. Russell, Solomon B. Stebbins, A. D. Weld, Jr., T. B. Williams, Boston; E. J. Collins, R. W. Dresser, J. C. Gilson, Newton, Mass.; Albert A. Cobb, Brookline, Mass.; C. C. Esty, Framingham, Mass.

—At the annual meeting of the Cincinnati, Hamilton & Dayton Railroad Company in Cincinnati, May 12, the old board of directors was re-elected, as follows: William Goodman, John Young, Lowell Fletcher, H. T. Huntington, George T. Stedman, C. W. West, Henry Lewis, F. H. Short, Cincinnati; Samuel Fossick, Glendale, O. The board elected F. H. Short, President; Charles W. West, Vice-President; C. C. Marsh, Secretary and Treasurer; Lewis B. Williams, General Superintendent. Mr. Short, heretofore Secretary and Treasurer, succeeds Mr. D. McLaren as President, and Mr. Williams, late Assistant Superintendent, succeeds him as General Superintendent. Mr. McLaren's intended withdrawal was announced some time since.

—The stockholders of the Wheeling, Pittsburgh & Baltimore Railroad Company have elected the following directors for the ensuing year: C. M. Reed, S. B. Hays, W. W. Smith, William Wakeman, Wm. S. Bissell, Wm. Keyser and J. B. Ford. The road is leased by the Baltimore & Ohio.

—The directors of the Chicago & Alton Railroad Company met in Chicago, May 13, and re-elected T. B. Blackstone President. The new firm of M. K. Jesup, Paton & Co. was designated as financial and transfer agent of the company in New York, in place of the lately dissolved firm of M. K. Jesup & Co.

—At the annual meeting of the Camden & Burlington County Railroad Company in Mt. Holly, N. J., May 9, the following directors were elected: Charles Bispham, George W. South, John W. Brown, John S. Dick, Job H. Gaskill, John Butterworth, A. W. Marley, Barclay Haines, Richard Ashhurst, Richard C. Shreve, John R. Slack, Strickland Knoess, George B. Roberts, Wm. J. Howard, H. B. Smith. Subsequently the board elected Charles Bispham President and John R. Slack Secretary and Treasurer.

—At the annual meeting of the Keokuk, Iowa City & Minnesota Railroad Company in Washington, Ia., May 6, the following directors were elected: Guy Wells, Wm. Timberman, D. Campbell, Chas. Snider, J. W. Wilson, Geo. J. Boal, C. W. McCune, A. Pauy, Jesse Boyd, John P. West, Joseph Howe, Geo. Auld.

—George H. Mumford has been chosen Vice-President and R. H. Rochester Secretary and Treasurer of the Pacific & Atlantic Telegraph Company.

—The officers of the new Geneva, Ithaca & Athens Railroad Company, formed by the consolidation of the Ithaca & Athens and Geneva & Ithaca companies, are as follows: President, Ezra Cornell; Vice-President, Charles M. Titus; Treasurer, George McChain; Secretary, Charles H. Blair; Superintendent, F. C. Cornell; General Freight Agent, J. B. Hixson.

—The directors of the Joliet & Chicago Railroad Company met in Chicago, May 13, and elected John Crerar President and W. M. Larrabee, Secretary. The road is leased to the Chicago & Alton.

—At the annual meeting of the Easton & Amboy Railroad Company the old board of directors was re-elected, as follows: Asa Packer, Mauch Chunk, Pa.; Robert H. Sayre, Bethlehem,

Pa.; Thomas N. McCarter, Newark, N. J.; J. Gillingham Fell, Charles Hartshorne, John H. Lyon, Harry E. Packer, E. M. Patterson, Samuel Thomas, Philadelphia. The board re-elected Asa Packer President and Charles Hartshorne Secretary and Treasurer. This is the company which is building the Lehigh Valley's line across New Jersey.

—General A. Bridgman has been appointed Acting General Manager of the Keokuk & Des Moines Railroad in place of John E. Henry resigned.

—At the annual meeting of the Bear River Valley Mining & Railroad Company, May 6, the following officers were elected: President, A. Miner; Vice-President, C. G. Davidson; directors, E. R. Young, A. H. Earl, J. R. Cutler, S. E. Underhill, D. Cooper; Treasurer, S. P. Neve; Secretary, P. W. Nuckolls.

—At the annual meeting of the New York & Harlem Railroad Company in New York, May 19, the following directors were elected for the ensuing year: Cornelius Vanderbilt, Wm. H. Vanderbilt, Wm. C. Wetmore, Augustus Schell, A. B. Baylis, James H. Banker, John B. Dutcher, Joseph Harker, Cornelius Vanderbilt, Jr., Robert J. Niven, Cornelius M. Meserole, Chauncey M. Depew, and Lewis G. Morris. The only change from last year is the substitution of Messrs. Depew and Morris for Horace F. Clark (deceased) and H. Allan.

—At the annual meeting of the Central Vermont Company in St. Albans, Vt., May 19, the following directors were elected: James A. Langdon, Montpelier, Vt.; John Gregory Smith, Worthington C. Smith, St. Albans, Vt.; John B. Page, Rutland, Vt.; James W. Hickok, Burlington, Vt.; Joseph Clark, Milton, Vt.; Jacob Esty, Brattleboro, Vt.; John H. Kimball, Bath, Me.; B. P. Cheney, Jacob Edwards, Boston, Mass.; G. M. Rice, Worcester, Mass.; John Q. Hoyt, John S. Schultz, New York. The new directors are Messrs. Hickok, Esty, Edwards, Kimball and Rice, who replace Tenor W. Park, J. McCullough, W. Butler Duncan, S. L. M. Barlow and George A. Brown. The changes were indicated clearly by the recent transfers of stock, all the New Yorkers retiring from the board except Messrs. Hoyt and Schultz, who represent the New York, Boston & Montreal. Mr. Parks' retirement from the board is said to be for political reasons, he being ambitious of being the next Governor of Vermont, and his connection with the company being a serious hindrance to that ambition. The management remains substantially in the hands of the old Vermont Central trustees.

—The first board of directors of the Joliet & Northwestern Railroad Company is as follows: Josiah M. Browne, Joliet, Ill.; George N. Chittenden, Plainfield, Ill.; John C. Campbell, Streator, Ill.; Eugene Canfield, Aurora, Ill.; James G. Strong, Dwight, Ill.; F. W. Davis, C. O. P. Holden, Chicago.

—The directors of the Brooklyn Steam Transit Company have elected the following officers: S. B. Chittenden, President; William H. Taylor, Vice-President; William R. Sheldon, Secretary; Henry W. Sage, Treasurer. Executive Committee, S. B. Chittenden, Henry W. Sage, Alfred S. Barnes, Robert Turner, Nathan G. Morgan.

—The directors of the new Grand Rapids & Van Wert Railroad Company are as follows: D. W. H. Howard, John C. Lee, T. M. Cook, C. H. Coy, G. W. Reynolds, Toledo, O.; George Laskey, George P. Hindale, S. S. Laskey, Grand Rapids, O.; J. D. Clark, D. A. Johns, T. S. Gilliland, D. B. Langworth, Van Wert, O.

—James Montgomery has been chosen President, George Cohen Vice-President, Harlan H. Peck Secretary, J. W. Montgomery Treasurer, and Edwin O. Fowler, Superintendent of the Montgomery Palace St. ck Car Company, of Chicago, a new corporation which has purchased the Street and Hugh Lee patents and now purposes to sell rights to railroad companies for the construction and use of a stock car with adjustable stalls for carrying a live stock in such a way that they can be fed and watched on the road.

PERSONAL.

—Mr. E. L. Ryder has resigned his position as Assistant General Superintendent of the Ohio & Mississippi Railway. The office has been abolished, and its duties will be performed by the Master of Transportation.

—Mr. John E. Henry has resigned his position as General Manager of the Keokuk & Des Moines Railroad.

—Capt. H. W. Tyler, Railway Inspector of the British Board of Trade, is coming to this country to examine the Erie Railway property—in the interest of the English shareholders, apparently—having obtained leave of absence from the Board of Trade. Captain Tyler is, we believe, a director of the Grand Trunk of Canada; at least he has visited this country with the President of that company and inspected parts of that property and reported on it orally at the shareholder's meeting.

—Mr. J. Prescott has resigned his position as Superintendent of the Eastern Railroad. It is probable that no successor will be appointed for a time, and that General Manager Hatch will, for the present, act as Superintendent.

—Mr. Thomas S. Davis, formerly connected with the Jersey City Locomotive Works, later with the Lancaster Works and for some time past Master Mechanic of the Milwaukee & St. Paul Railway, has resigned his position.

TRAFFIC AND EARNINGS.

—The earnings of the Detroit & Bay City Railroad for the year 1873 were:

Passengers.....	\$ 58,800 91
Freight.....	133,765 42
Other sources.....	1,210 06

Total earnings (\$2.498 per mile).....	\$199,806 99
Operating expenses (\$6.22 per cent.).....	112,836 22

Net earnings (\$1,093 per mile)..... \$ 87,470 67

—The coal traffic of the Pennsylvania Railroad for the first week in May was:

Anthracite (tons of 2,000 lbs).....	6,458
Bituminous.....	87,654
Coke.....	11,304

Total.....	75,416
Danville, Hazleton & Wilkesbarre (anthracite).....	1,891

Total, all kinds.....77,307

—The earnings of the Midland Railway, of Canada, for the four months ending April 30 were: 1874, \$74,577; 1873, \$65,801; increase \$11,776, or 17 1/2 per cent.

—The earnings of the Michigan Central Railroad for the first week in May were: 1874, \$142,186; 1873, \$140,003; increase, \$2,183, or 1 1/2 per cent.

—The earnings of the Chicago, Milwaukee & St. Paul Railway for the second week in May were: 1874, \$220,000; 1873, \$156,042; increase, \$63,958, or 41 per cent.

—The earnings of the New Haven & Derby Railroad for the year ending April 30, 1874, were:

Earnings (\$6.087 per mile).....	\$78,743 32
Expenses (51.38 per cent.).....	48,330 91

Net earnings (\$2,339 per mile).....\$30,412 47

The trains ran 42,147 miles during the year and carried 130,720 passengers and 21,709 tons of freight.

The Utah Central Railroad carried during April 10,043 tons of freight, of which 3,620 tons was coal and coke.

The Utah Southern Railroad carried during April 5,803 tons of freight, of which 1,493 tons was ore and bullion, 2,160 tons coal and coke, and 645 tons iron ore.

The earnings of the Chesapeake & Ohio Canal for April were: 1874, \$51,089.47; 1873, \$58,626.85; decrease, \$7,537.38, or 13 per cent. The coal tonnage passing through the canal for the month was: 1874, 71,066 tons; 1873, 86,478 tons; decrease, 15,412 tons, or 17½ per cent.

The earnings of the Chicago & Northwestern Railway for the first week in May were: 1874, \$237,753; 1873, \$221,659; increase, \$16,094, or 7¼ per cent.

OLD AND NEW ROADS.

Thousand Mile Tickets.

At a meeting of railroad managers in Chicago, May 16, it was agreed that no first-class local tickets except commutation and season tickets should be sold for less than three cents per mile. No 1,000-mile tickets shall be sold good for more than one person, whose name shall be written on the tickets. Such tickets shall be issued at only one office. The agreement was signed by representatives of the Chicago, Burlington & Quincy, Milwaukee & St. Paul, Illinois Central, Chicago & Northwestern and Chicago & Alton companies. Mr. Biddle, for the Chicago, Rock Island & Pacific, promised verbally to conform to the agreement. The secretary of the meeting was instructed to procure the signatures of the Chicago, Danville & Vincennes and Chicago & Pacific companies.

Erie.

An important change has been made in the organization of the road. The offices of the Third Vice-President, who had the supervision of the permanent way, and the Fourth Vice-President, who had charge of the equipment, have been abolished. The road will be under the charge of a General Manager, who will have under him three assistants, the Superintendent of Transportation, who will have charge of the operation of the line, and will have under him the necessary division superintendents and other officers; the Chief Engineer, who will have charge of the roadway, track, bridges and buildings; the Superintendent of Rolling Stock, who will have charge of the shops and of the construction and repair of all equipment. The General Manager will have power to appoint and dismiss all subordinates, and make all necessary rules, with the approval of the President. He will perform all the duties which have heretofore fallen to the Third and Fourth Vice-Presidents.

Mr. James O. Clarke, the late Third Vice-President, is appointed General Manager. Mr. Tyson, the Fourth Vice-President, retires from the service of the company. There are rumors of many changes among subordinate officers, and it is also reported that many of the old men who have left the road lately will be reinstated shortly.

A final location has been made of a new cut-off or short line to be used for freight trains. It leaves the old line near Rutherford Park, crosses Saddle River at Zabriske's Mill, passes under the New Jersey Midland near Rochelle and rejoins the old line near Ridgewood, north of Paterson. The new line will be 10 miles long, two miles shorter than the old line, will be nearly straight and have no grade over 17 feet to the mile. It will avoid the heavy grades and curves of the old line, especially the bad reversed curves near Passaic.

The examination of the accounts by the Messrs. Glegg and Bishop, the two accountants sent over from London, has been commenced.

A line of sleeping coaches is to be put on to run from New York to St. Louis over the Erie, Atlantic & Great Western and Ohio & Mississippi roads. The change of gauge will be made at Cincinnati, where the coaches will be transferred by a car-hoist from the wide to the standard-gauge trucks.

The bridge which carries this road over the New York Central & Hudson River road, near Batavia, on the Buffalo Division, was burned on the night of May 13. Considerable delay was caused, and for two or three days passengers had to be transferred at the break.

The General Freight Agents' Association.

The next regular meeting of the Association will be held at the Palmer House in Chicago, Wednesday, May 27.

European & North American.

The shops at Oldtown, Me., were destroyed by fire May 14. The loss is stated at \$12,000.

The Wisconsin Railroad Law.

The Wisconsin Valley and Sheboygan & Fond du Lac companies have given notice of their intention to comply with the law. The Western Union Company has filed copies of its freight and passenger tariffs with the Commissioners.

The Wisconsin Supreme Court granted leave to the Attorney General, May 17, to bring actions in the nature of *quo warranto* against the Milwaukee & St. Paul and the Chicago & Northwestern Companies to vacate the charters for refusing to obey the law. The Governor refused the proposal of the companies to have the suit brought in the United States courts.

Troy & Boston.

The suit of Trenor W. Park and the trustees of the Western Vermont Railroad against the Troy & Boston Company is to be reopened. In 1857 the Western Vermont (now part of the Harlem Extension) road was leased to the Troy & Boston Company for 10 years, a condition of the lease being that at its expiration the road should be returned in as good condition as when leased. When the lease expired, in 1867, suit was brought for damages, on the ground that the value of the road had depreciated under the Troy & Boston management. The case was taken to the Vermont Supreme Court, and then to the United States Circuit Court, which decided that there was no ground for damages, two years ago. The United States Supreme Court has now set aside this decision and ordered a new trial. The case excited much attention in 1867-68, when Troy & Boston trains were levied on and prevented from crossing the State line, and a special session of the Legislature was called to adjust matters.

Southern Pacific, of California.

On the line which the company is building from Los Angeles, Cal., west to San Bernardino, a section has been completed for business from Los Angeles to Spadra, 30 miles.

A number of the officers of the company have been visiting the country on the line of the extension from Delano, Cal., southward. The object of the visit was to locate the end of the line which is to be built the present season, on which work has already been commenced. It is probable that Bakersfield, in Kern County, will be the terminus for this year.

It is reported that an extension of the coast line will be built this year from the present terminus at Soledad, Cal., southward to the Mission of San Miguel in San Luis Obispo County.

Joliet & Northwestern.

A company has been incorporated under the general laws of Illinois for the purpose of constructing a railroad from Joliet, Ill., where the Chicago, Rock Island & Pacific, the Chicago & Alton, and the Joliet Division of the Michigan Central meet, northwest to Aurora, Ill., and thence north to Geneva. The distance from Joliet to Aurora is about 20 miles, and thence to Geneva 10. The new company hopes to induce the Chicago

& Northwestern to extend its branch from Geneva to Batavia southward eight miles to meet the new line at Aurora, and to use it as an outlet for through freight interchange with the Michigan Central. The line from Aurora to Joliet the Chicago, Burlington & Quincy intended to build a few years ago, as a cut-off for the interchange of through freight without the necessity of passing through Chicago. The value of the line would depend almost entirely on the disposition of this and the Northwestern to use it. The capital stock of the company is to be \$500,000.

New Orleans, Mobile & Texas.

The bridges at Pascagoula and Pearl River have been rebuilt and trains now run through from New Orleans to Mobile, after a break of nearly three weeks.

Cairo & Tennessee River.

Mayfield, Ky., has voted \$25,000 to this company, payable when the road is completed to within a mile of the city.

Teledo, Ann Arbor & Northern.

Proceedings in bankruptcy are to be commenced against this company. This is done in order to bring it into the United States Court, when, it is believed, delinquent subscribers to the stock can be made to pay up.

Green Bay, Wabasha & Faribault.

The town of Wabasha, Minn., has voted to take \$75,000 stock in this company.

Green Bay & Minnesota.

The docks on the Mississippi opposite Winona, Minn., are nearly completed and the company will soon be ready to transfer freight to the boats on the river at that point.

Jacksonville, Pensacola & Mobile.

Florida papers of recent date state that this road has once more been put in the hands of a receiver.

Pennsylvania & Delaware.

A meeting of the stockholders is to be held in Philadelphia, May 28, to vote in the final ratification of the lease to the Pennsylvania Railroad Company.

Pennsylvania.

The two headings of the tunnel at Port Ferry, Pa., have met, and the work is advancing rapidly. The branch line through this tunnel is to connect with the Pittsburgh, Virginia & Charleston, and over that road connection will be made with the Pittsburgh, Cincinnati & St. Louis just outside of Pittsburgh, and south of the river. Freight can then be transferred from the Pittsburgh, Cincinnati & St. Louis to the Pennsylvania without passing through the city.

Chesapeake & Ohio.

At the last monthly meeting of the directors it was reported that after providing for the April expenses there was a cash balance of \$64,901 on hand. The board ordered that out of this money should be paid the coupons due July, 1859, on the preferred construction bonds. The payment will be made on and after May 26, at the banking house of Alexander Brown & Sons, Baltimore.

Berks County.

The road is completed and trains are running to Lenhartsville, Pa., 28 miles north of Reading. This makes 30 miles of the road completed in all.

Peachbottom.

Tracklaying has been commenced on the Western Division, west of the Susquehanna, and is progressing steadily.

Old Colony.

The stockholders have, by a vote of 35,206 to 3,369, authorized the directors to invest \$750,000 in the stock of the company running steamboats to New York in connection with the road and \$40,000 in stock of the company running boats to the islands in Vineyard Sound. The New York steamboat company is the Old Colony Steamboat Company, which, it is said, either has purchased or will purchase the boats of the Narragansett Steamship Company.

Deerfield Valley.

Surveys are to be made at once of the line from the Troy & Greenfield road, north by west to Dorset or Manchester, Vt., passing through Coleraine, Wilmington and Dover.

Canada Southern.

A chattel mortgage, covering all the rolling stock and other personal property of the company, has been filed in New York. It is for \$9,000,000, and is to W. L. Scott and Kenyon Cox as trustees. The officers of the company state that it is not intended to cover any new issue of bonds, but is to afford additional security to the bonds issued under the first mortgage on the road, which was executed and filed in Canada.

The claims under which the property of the company in New York was attached have been settled.

Junction.

A company by the name of the Junction Railroad Company has been organized in Boston to build the proposed line which is to connect the lines entering Boston from the west with tide water at South Boston.

Savannah & Charleston.

The receiver recently appointed is instructed to apply the net earnings, first, to the payment of the coupons named in the report of December 18, 1872; second, to the payment of other outstanding coupons; third, to the payment of other liens and unsecured debts. All creditors are allowed to come in as parties to the suit, and all other suits against the company by creditors are enjoined.

Maryland & Pennsylvania.

Work has been resumed on the grading near Towson town, Md. The road is to run from Baltimore northeast to the Pennsylvania line.

New York & New England.

The repair shops at Readville, Mass., were partially destroyed by fire May 14. The loss is estimated at \$40,000.

Wallkill Valley.

An effort is being made to secure united action among the bondholders for the protection of their interests. It is desired to secure the payment of the interest due and to investigate the alleged over-issue of bonds.

Boston Steamer Line.

It is stated that the steamers of the Cunard Line which now run from Boston to Liverpool are to be withdrawn June 1 for three months and possibly longer. Some vessels of the line will touch at Boston for passengers and light freight on their way to and from New York. The reason for this action is that the receipts from the Boston line are not satisfactory. The Boston merchants attribute this to high rates of freight, especially on grain, and heavy terminal charges. Committees of the Board of Trade and Commercial Exchange have been appointed to confer with the officers of the Boston & Albany road to see if some improvement cannot be made.

Allegheny Valley.

It now appears that this company is not at present able to meet promptly its maturing obligations. There have been very heavy expenditures for construction on the Eastern Ex-

tension, and it is also said that under the administration of the late President, Colonel Phillips, the accounts were very loosely kept, and that his private business is so mixed up with that of the company that it is very difficult to tell just how the company stands. A thorough examination of the affairs is being made and the result will be published as soon as possible.

Lehigh Valley.

This company is following the example of the other anthracite coal roads and is extending its purchases and leases of coal lands. The latest lease is of the property and mines of the Spring Mountain Coal Company, and is for ten years. The rental is 7 per cent. on the coal company's capital and one-half of all profits over that amount.

Warren & Jefferson.

The first section of this road, from Warren, Pa., southward to Sheffield, has been located and work begun. The road is to extend from Warren south some 60 miles into the coal region of Jefferson County.

Geneva, Ithaca & Athens.

The stockholders of the Geneva & Ithaca and Ithaca & Athens companies have ratified the agreement of consolidation by a nearly unanimous vote and the new company has been fully organized under the above name. The road is 78 miles long, from Geneva, N. Y., south by east to Ithaca and thence nearly due south to Athens, Pa., connecting at Sayre with the Pennsylvania & New York road.

Visalia Branch.

A branch line about seven miles long is to be built from Visalia, Cal., to the nearest point on the Visalia Division of the Central Pacific. The Central Pacific has agreed to equip and operate the road.

North Shore, of Staten Island.

Work has been begun on the grading of this road near Factoryville, N. Y., and is progressing slowly.

Pacific Mail.

The new steamer City of Tokio, a companion ship to the City of Peking, was launched at Chester, Pa., May 13. She is 423 feet long, 45 feet beam and 38½ feet deep, 5,500 tons burthen and will carry 150 cabin and 1,800 steerage passengers. The City of Peking will be ready for service about July 1.

St. Louis Depot.

This company has, it is said, received guarantees of a certain per cent. of income from nearly all the companies whose roads enter St. Louis. The Atlantic & Pacific has turned over to the Depot Company the land purchased by it for depot purposes.

Dividends.

Dividends have been declared by the following companies:

Cleveland & Pittsburgh, quarterly, 1½ per cent. on the guaranteed stock, payable June 1.

Adams Express, quarterly, \$2 per share, payable June 1.

Transfer books are closed from May 18 to June 2.

Northern of New Hampshire, \$1 per share, payable June 1.

Meetings.

The following companies will hold their annual meetings at the times and places given:

New Jersey Midland at the office No. 96 Liberty street, New York, May 26.

Chicago & Northern Pacific Air Line in Chicago, June 10.

The Chicago & Southwestern will hold its annual meeting at 10 a. m. June 10, at the east end of the Kansas & Missouri Bridge, opposite Leavenworth.

New York & Oswego Midland.

A meeting of the first-mortgage bondholders was held in New York, May 15, when Mr. A. S. Hewitt, the Receiver, presented a report. When he took possession in September last he found that for the year just closing the loss on operating the road had been \$574,492.29, which deficiency payment of rentals and interest had increased to \$1,688,449.74. The road was losing \$5,000 a day, the employees had been long unpaid and considerable expenditures were needed on the road. As soon as possible all leases were given up, except those of the Rome and Utica lines, from which a considerable profit was derived. An arrangement had been made to exchange freight with the Erie at Middletown. Much trouble had been caused by strikes of the employees. Settlement had been made of all claims for rolling stock except those of the Rogers Locomotive Works, which refused to settle. In April the deficiency was reduced to about \$5,000 per week, and in May the road began to earn its expenses for the first time. The receivers' certificates issued up to May 11 amounted to \$951,708.41, of which \$385,137.69 were in settlement of labor claims, \$511,173.27 for equipment claims and \$55,395.78 for rental of Rome and Utica branches. Mr. Hewitt said that there was a pressing necessity for an early sale of the road on first mortgage, a large amount of right of way having to be settled for immediately or the title would be lost. In conclusion he requested to be relieved from his duties, and paid a flattering compliment to the ability and zeal of his co-trustee, Mr. Stevens.

The bondholders referred the report to a committee which should report at a meeting to be held hereafter.

Union Pacific.

A petition in bankruptcy was recently filed against this company in the United States District Court in Boston. The petition alleged that the debts of the road amount to \$18,198,709, of which \$8,198,709 is now due, and \$10,000,000 will fall due on September 1, 1874; and that the treasury does not contain the funds necessary to meet these obligations. It is stated that the act of 1873, authorizing the Attorney General to bring suit against the company in the Credit Mobilier case, contained a clause exempting it from proceedings under the bankruptcy laws. The Court was to hear arguments in the case May 23.

Chicago & Alton.

The suit brought against this company by the Illinois Railroad Commissioners in the Sangamon Circuit Court has been removed by a writ of *certiorari* to the United States Circuit Court. The Commissioners will submit arguments against the jurisdiction of the United States Court.

North Shore, of Canada.

Mr. Thomas McGreery, the new contractor, has telegraphed from London to the Quebec Chronicle that he has secured the necessary means to build the road.

New York Elevated.

Preparations are being made to build the extension of the road from the present terminus at Thirty-fourth street to Central Park, and also to build a short extension from the present down-town terminus in Greenwich street through Battery place and State street to the South Ferry. It is intended to have both these extensions completed this season.

St. Paul & Pacific.

The Main and Branch lines of the St. Paul & Pacific road, leased by the Northern Pacific Company in 1871, have been formally surrendered to Mr. Litchfield as representative of the stockholders.

Receiver Farley has commenced running trains over the St.

Vincent Extension, from the Northern Pacific at Glyndon, Minn., north to Crookston. North of Crookston the road is hardly in a condition to be used as yet.

South Side of Long Island.

Judge Donohue, in New York, May 9, made a new order appointing Edward D. Gale Receiver, at the suit of Edward O. Clinch. The suit is the same as that in which the original appointment of Gale as Receiver, but was brought in a different form, in order to meet certain technical objections.

The road, however, still remains in the hands of the United Marshal in the bankruptcy proceedings, and is being operated by Mr. Garman, the President, under direction of the Marshal.

Baltimore & Ohio.

This company has commenced running a fast freight line westward from Baltimore which goes through without delay, and has made arrangements for close connections with other roads. The train leaves Baltimore at 9 p. m., reaches Cincinnati on the morning of the third day, that is, in 56 hours, St. Louis and Chicago on the fourth day, or in 90 hours.

Cairo & Vincennes.

The Court has appointed Mr. A. B. Safford, Cashier of the City National Bank of Cairo, one of the receivers, in place of Mr. Greer, of Chicago, who declined. Mr. Safford has accepted and filed the required bonds.

Atlantic & Great Western.

The particulars of the lease to the Erie have been agreed upon by the directors of both companies, and the agreement will shortly be submitted to the stockholders. The full particulars of the lease will not be published until the stockholders' meetings are held, but it is understood that the Erie is to pay as rental a per centage of gross earnings, which is to increase gradually until a maximum (variously reported as 30 and 35 per cent.) is reached, and that there will be no guarantee of interest or of any specific amount of rental.

Toledo, Peoria & Warsaw.

James F. Seor and W. Tracy, trustees under the consolidated mortgage, having applied to the United States District Court in Chicago for the appointment of a receiver, the Court, after hearing arguments, refused to grant the application. It was ordered that the trustees, who have been in possession since February 3, continue to hold and operate the road as trustees until further orders of the Court, but without prejudice to the rights of any party interested to contest their claim of possession under the mortgage. The motion for a receiver was opposed by the company, the Pennsylvania Company, the holders of some of the bonds and a number of judgment creditors.

Stockton & Ione.

Subscriptions to the stock are increasing in amount. The company is advertising for proposals for grading and bridging the road from Stockton, Cal., to Linden.

Seattle & Walla Walla.

The contract for the first five miles of this road has been let. The contractors are to be paid in stock. The road is to extend from Seattle, w. T., on Puget Sound, southwest to Walla Walla, and will be about 280 miles long.

Selma, Rome & Dalton.

The foreclosure sale of the 64 miles of road in Georgia at the suit of J. Boorman Johnston and John A. Stewart, trustees, includes the road and franchises and such equipment as is in the hands of the Georgia receivers. The property is not to be sold for less than \$500,000, the commissioners, however, reserving the right to ask the Court to confirm a sale for a less sum. Of the purchase money, \$150,000 must be paid in cash in 30 days after the sale, and the remainder can be paid in cash or bonds. The sale will take place in Rome, Georgia, July 7. Benj. C. Wyly and Daniel S. Printup are the commissioners appointed to make the sale.

Cost of Mail and Postal Service.

In the published part of Mr. Albert Fink's "Investigation into the Cost of Transportation on American Railroads," which gives very carefully made deductions from actual experiences recorded on lines of varying circumstances for a series of years, there is the following discussion of the cost of mail transportation in the various ways practiced in this country:

We will now proceed to investigate the cost of the mail and postal service which the railroad companies of this country are required to perform, and investigate the principle on which compensation should be and is being made.

On this subject a great difference of opinion exists between railroad companies and the Post-Office Department, which is not to be wondered at when we bear in mind how great a difference exists in the cost of transportation on different roads. Regardless of this, compensation is regulated by act of Congress, and is based upon the net weight of mail carried, and not upon the manner in which it is carried—an important item in the cost of the service, as will be more fully explained hereafter. It may therefore happen, and it does happen, that the mail service on some roads is a source of profit, while on others it is performed at a loss; hence while some companies complain, others are perfectly satisfied.

The service required of the railroad companies may be classified as follows:

1. Mail carried in a postal car, properly furnished, in charge of a number of clerks attending to its distribution—a service formerly performed at the several post-offices.
2. Mail carried in apartments in the baggage-car of various sizes, in charge of route-agents, who attend to its assortment and distribution.
3. Mail carried in baggage-cars, in charge of the baggage-master, who performs the service of a route-agent in receiving and delivering the mail at stations on the route.
4. Mail carried in baggage-cars, like baggage or express, delivered and received only at the principal or terminal stations of the route.

The cost of carrying one ton of mail matter varies very much according to the special modes in which it is carried. In order to ascertain the cost of the service and the proper compensation based on this cost, it is necessary to know—1. The weight of the mail matter, together with the weight of the agents; 2. The dead weight carried on account of the mail and the agents; 3. The cost per ton of carrying dead and net weight, with the addition of a reasonable profit.

In what follows I propose to make an estimate of the compensation that should be allowed for the different mail services before enumerated. This estimate will be based upon a cost of 1.25 cents, 1.66 cents and 2 cents per ton per mile of gross weight, embracing nearly the variation of cost on roads as far as they have come under our observation. To the cost is added 80 per cent. for profit, which would make the net revenue derived from the mail service 33½ per cent. of the gross revenue—about an average of net earnings on American railroads. Accordingly the estimate is based on 2 cents, 2.5 cents and 3 cents per ton per mile of gross weight carried.

1. **Postal Car Service.**—The following statements show the estimated compensation for running postal cars. Column 1 shows the length of cars; 2, the weight; 3, the net weight of the mail, which is estimated from 1 to 1.6 tons in each car, the usual amount carried; 4. The weight of agents, from three

to five in each car; and the remaining columns as indicated under the respective headings.

LENGTH OF CAR.	WEIGHT OF				AT 2 CENTS PER TON.		AT 2.5 CTS. PER TON.		AT 3 CENTS PER TON.	
	Car.	M'l.	Ag'ts.	Total.	Per mile.	Per year.	Per mile.	Per year.	Per mile.	Per year.
40 feet..	16.85	1.00	0.225	18.075	36.15	226.30	45.19	282.89	54.23	339.48
45 feet..	18.60	1.20	0.225	19.425	38.85	243.20	48.56	303.98	58.27	364.77
50 feet..	20.00	1.40	0.300	21.700	43.40	271.68	54.25	339.60	65.10	407.63
60 feet..	26.50	1.60	0.375	28.475	56.95	356.50	71.19	445.65	85.43	534.79
1	2	3	4	5	6	7	8	9	10	11

From this table we derive the following results in regard to the compensation for mail service in postal cars when based upon the net ton of mail, the weight being as assumed in column 3:

LENGTH OF CAR.	PER TON OF NET WEIGHT.		
	At 2 cents per ton of gross w't.	At 2.5 cents per ton of gross w't.	At 3 cents per ton of gross w't.
40 feet.....	36.15	45.19	54.23
45 feet.....	38.85	48.47	58.27
50 feet.....	43.40	54.25	65.10
60 feet.....	56.95	71.19	85.43

To show how little influence the weight of mail matter carried in postal cars has upon the cost of performing the service, we will assume that in a postal car 40 feet long, instead of one ton of mail, only one half ton be carried. The compensation (based on cost) per mile run of postal car should be, at the rate of 2 cents per ton of gross weight, (16.85 + 0.5 + 0.225) × 2 = 35.15 cents, being nearly the same as if one ton was carried (36.15 cents); instead of which, if compensation was based on the amount of mail matter carried, it should be 70.30 cents per ton, or nearly twice as much as before.

2. **Mail Service in Apartments of Baggage-car.**—The following statement shows an estimate of compensation based on cost for that class of service. Column 1 gives the length of the apartment used for mail purposes; 2, the corresponding weight (the total weight of a baggage-car fitted to carry mail, express and baggage, length fifty feet, six-wheel trucks, is twenty-two tons; see Table VIII). Column 3 shows the net weight of mail, estimated from a quarter of a ton to one ton; 4, the weight of the route-agent (no route agent is estimated for in the five-foot apartment). Columns 6, 8 and 10 show the estimated compensation per mile run, and columns 7, 9 and 11 the same per year of 313 days, both ways.

LENGTH OF APARTMENT.	WEIGHT OF				AT 2 CENTS PER TON.		AT 2.5 CTS. PER TON.		AT 3 CENTS PER TON.	
	Ap'tment.	Mail.	Ag't.	Total.	Per mile.	Per year.	Per mile.	Per year.	Per mile.	Per year.
5 ft.	2.30	0.25	0.075	2.625	5.25	32.81	6.56	40.91	9.83	61.46
10 ft.	4.40	0.50	0.075	4.975	9.95	62.29	12.44	77.87	14.81	92.46
15 ft.	6.50	0.75	0.075	7.425	14.85	92.96	18.66	116.18	22.27	139.41
20 ft.	8.60	1.00	0.075	9.875	19.75	123.64	24.68	154.49	29.62	185.42
1	2	3	4	5	6	7	8	9	10	11

From this statement we derive the following results in regard to compensation for mail service in apartment of baggage-car, the amount of mail and size of apartment as assumed in columns 1 and 3:

LENGTH OF APARTMENT IN CAR.	PER TON OF NET WEIGHT.		
	At 2 cents per gross ton.	At 2.5 cts. per gross ton.	At 3 cents per gross ton.
5 feet.....	19.60	24.48	29.40
10 feet.....	19.90	24.58	29.50
15 feet.....	19.80	24.74	29.69
20 feet.....	19.75	24.68	29.62

Should we, however, vary the weight of the mail, as shown in column 3, and assume only one-half to be carried in the same apartment of the baggage-car, we will find that the cost of the service performed as measured by the mile run would be nearly the same, while the cost per net ton per mile would be doubled; showing that the net weight of the mail is no criterion of the cost of the service. On the contrary, the space occupied in the baggage-cars and the corresponding dead weight (to which is to be added the average net weight) would be the proper basis for computation.

3. **When mail matter is carried in charge of the baggage-master acting as a route-agent, receiving and delivering, it is more difficult to ascertain the exact cost of the service than in the two preceding cases.** On unimportant routes only, where the weight of the mail perhaps does not exceed 200 pounds per day, is this mode of carrying mail adopted. A certain amount of room is required, besides the service of the baggage-master, to transact this business, independent of the weight of the mail, but how much is more a matter of judgment than of measurement. I have assumed that up to a quarter of a ton of mail matter a space of five feet of the length of the baggage-car might be allowed for the mail service, and on this basis the compensation for the service has been estimated, as shown in the two preceding statements.

4. **When mail is carried like express matter it is still more difficult to ascertain how much space in the baggage-car is actually used for that purpose.** We have seen before that one ton of mail matter may be put in a space occupying four feet of the length of the baggage-car. An estimate of the cost upon this basis (the four feet of the baggage-car weighing 1.76 tons, mail 1 ton, total gross weight 2.76 tons), at 2 cents, 2.5 cents, and 3 cents, would be respectively 5.52 cents, 6.90 cents, and 8.28 cents per ton per mile. But this estimate presupposes that the ton of mail is carried over the whole length of the route and also on the return trip.

Compensation cannot be based upon the actual weight for the actual distance carried, but upon the weight of the portion of the car required to receive the largest amount of mail at any one time, and for which accommodation must always be in readiness. In order to comply with this requirement of the service, a large amount of dead weight without a correspond-

* The weight of a postal car on the Pennsylvania Railroad, 46 feet long, is 36,900 pounds. (See Proceedings of Select Committee on Transportation, April 8, 1873, in New York, pages 69 and 147.) This weight has been made the basis of the estimate of the weight of cars as shown in column 2.

The cars from 40 to 60 feet in length are supposed to have four-wheel and the 60-foot cars six-wheel trucks. The weight of a six-wheel truck on the Louisville & Nashville Railroad is 9,800 pounds, a four-wheel truck 6,850 pounds—making a difference of three tons in the weight of cars with four-wheel and six-wheel trucks.

ing load has often to be carried. In this respect the business transacted on passenger trains materially differs from that on freight trains. Freight cars can always be fully loaded, at least going in one direction. Nor is it necessary to run freight trains except when there is a full load for them; while passenger trains with a certain number of cars have to be sent out at regular times (often with a special regard to the mail service), whether there is a load or not. On this account, apart from the increased cost caused by greater speed, the service on passenger trains is greatly increased over that on freight trains, and the cost of carrying freight cannot be made the basis of compensation for carrying mail or express on passenger trains.

The cost of transportation on passenger trains depends much more on the amount of dead weight carried on account of any special service than on the net weight and the actual distance it is carried. In determining the cost of the class of mail service under consideration, it is therefore necessary to observe the largest amount of space required on account of it in the car at any one time, and compensation should be based on the corresponding dead weight and the average net weight, and not upon net weight alone. A ton of mail or express matter can be transported, as we have seen, under favorable conditions, for 5.52 cents per mile (including profit); but under the ordinary conditions of the service—for example, on the Main Stem of the Louisville & Nashville Railroad—the actual cost is 11.10 cents for mail carried in baggage car, and for express it is 14.17 cents.

In the foregoing I have endeavored to establish a proper basis on which the compensation for mail service ought to be regulated. It may be necessary to remark here that it is not the intention to determine what should be the exact amount of compensation in any one case, but merely to ascertain and illustrate the principles on which the cost of the service should be ascertained.

In these computations we have had to assume the net weight of the mail, and to estimate the necessary dead weight as well as the cost of carrying one ton per mile of gross weight. If variations occur in these particulars, the result will of course vary; but as the conditions assumed are, as far as my observation extends, those under which the mail service is generally performed, it is believed that the computation will apply to a large majority of roads.

The conclusions to which this investigation has led may be summed up thus:

1. The cost of transportation on different roads and under different circumstances varies. The compensation, if cost is to be made the basis, should be regulated with a view to this difference.
2. The cost of transportation is not so much dependent on the net weight of the mail as upon the mode in which it is carried; and hence the accommodations furnished, measured by the gross weight, should be made the proper basis for compensation.

We will now endeavor to point out in what particulars the present law (of March 3, 1873) governing compensation for mail service comes in conflict with these principles. The following shows the rates fixed by law:

1	2	3	4	5
WEIGHT OF MAIL.	Compensation per Year per Mile of Road.	Compensation per Year per Mile of Road.	Length of Postal Car, in feet.	Actual Compensation per Year per Mile of Road.
200 pounds.....	\$50 00	\$1 00	.....	.....
500 ".....	75 00	96	.....	.....
1,000 ".....	100 00	64	.....	.....
1,500 ".....	125 00	63	.....	.....
2,000 ".....	150 00	48	40	\$25 00
3,500 ".....	175 00	32	45	30 00
5,000 ".....	200 00	25	50	40 00
For every additional 2,000 lbs.	25 00	08	50	50 00

A few comparisons will bring out the striking differences existing between the compensation as determined by law and as computed on basis of cost. According to the former, a road that carries one ton of mail receives \$150 per mile of road per year, or 48 cents per ton per mile, no matter whether this mail is carried in charge of the baggage-master in a space of four feet in a baggage car, or in a space of twenty feet in charge of a route agent; but if carried in a postal car, four cents additional per ton per mile are allowed.

The following statement shows at a glance the variation in compensation per law, and according to the cost of the service:

	In baggage car same as express matter.	In 20-foot apartment with route agent.	In postal car.
According to law per mile of road.....	\$150 00	\$150 00	\$175 00
According to cost (at 2 cents per ton).....	34 55	125 63	226 30
According to law per ton per mile.....	48.0 cents.	48.00 cents.	52.00 cents.
According to cost (at 2 cents per gross ton).....	5.52 cents.	19.75 cents.	35.59 cents.

It must be borne in mind in making the comparison that in the estimate of compensation according to cost only the relative value of the service performed is shown. The estimate is based on the assumption that one ton of mail is carried in three different modes. If only one-half of a ton was carried in the same car-space, the cost of the service in each case would be nearly the same, while the cost per ton per mile would be very nearly doubled, but the relative cost of the three different modes in which the mail is carried would not be changed; and to this particular point we wish to call attention, the law allowing nearly the same compensation in each case, while the cost is as 5.52 cents, 19.75 cents, and 35.59 cents.

To illustrate further the operation of the present law, and bearing in mind that according to it compensation is based on net weight for the actual distance carried, we will suppose a road of one hundred miles in length which takes at the starting-point one ton of mail in a twenty-foot apartment of a baggage-car, but delivers the same along the route, say an equal amount at equal distance, and arrives at the terminal station without any mail. On the return trip the same weight of mail is supposed to be carried in the same manner. This road is compensated for carrying one ton of mail over its entire length at the rate of \$100 per mile per year.

Now suppose on another road of the same length the train starts with the same amount of mail (in an apartment of the baggage car of the same size), but carries it over the whole length of the route, and also on the return trip. This road is compensated for carrying two tons of mail daily over the whole length of the route at the rate of \$175 per mile of road. The cost of the service performed is very nearly the same (at the rate of one per cent. per ton per mile there is a reduction of 313×1.53=\$4.16 per year), but the increase in compensation is \$75.

This great difference between cost and compensation is the